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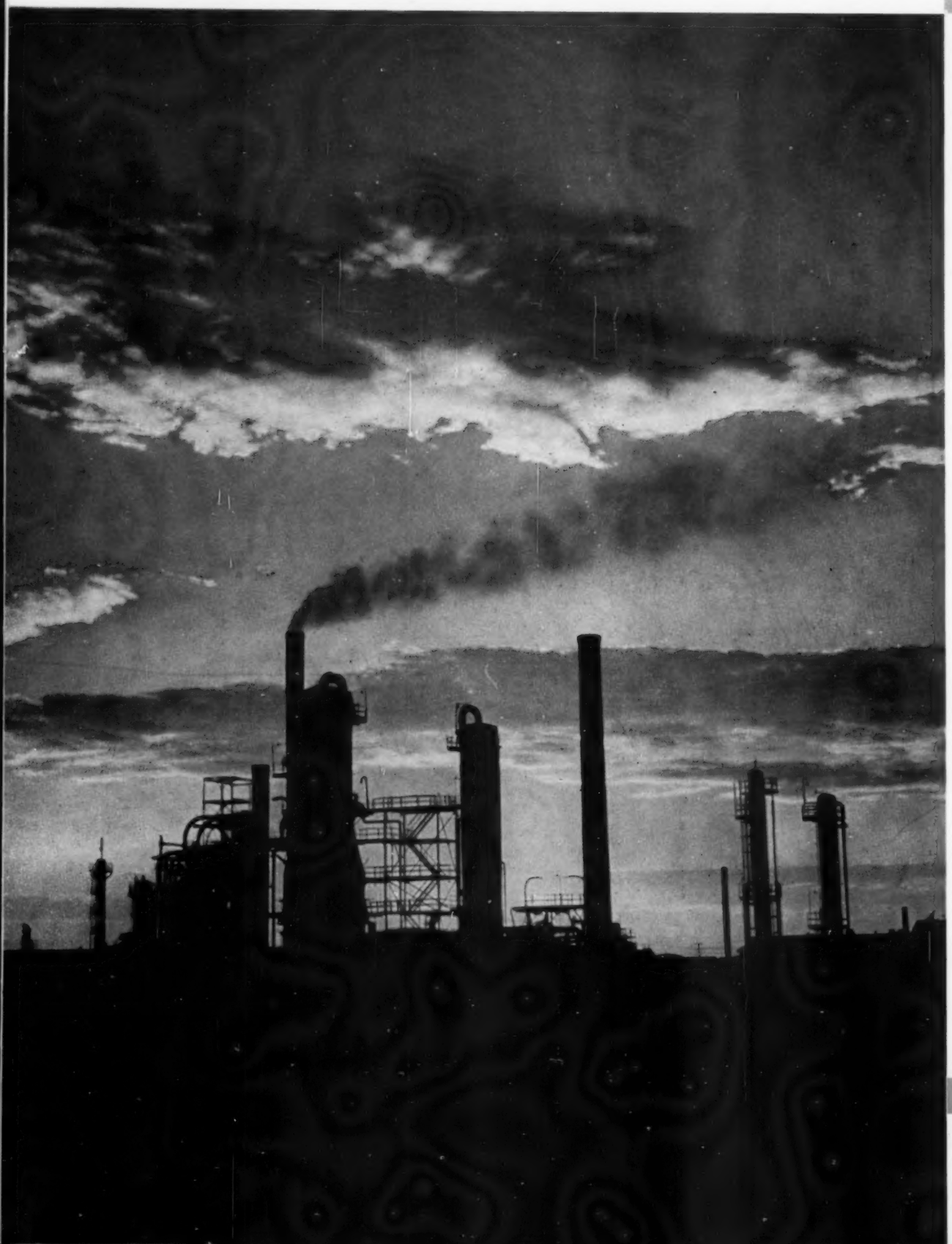

THIRTY-FOURTH ANNUAL MEETING, AMERICAN PETROLEUM INSTITUTE

NOVEMBER 1954

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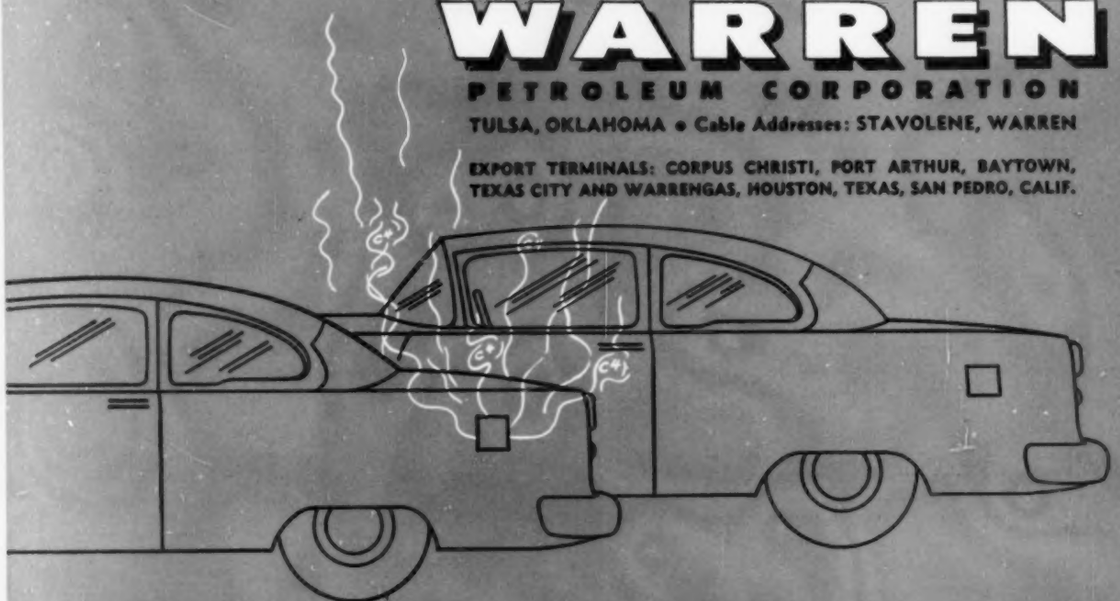
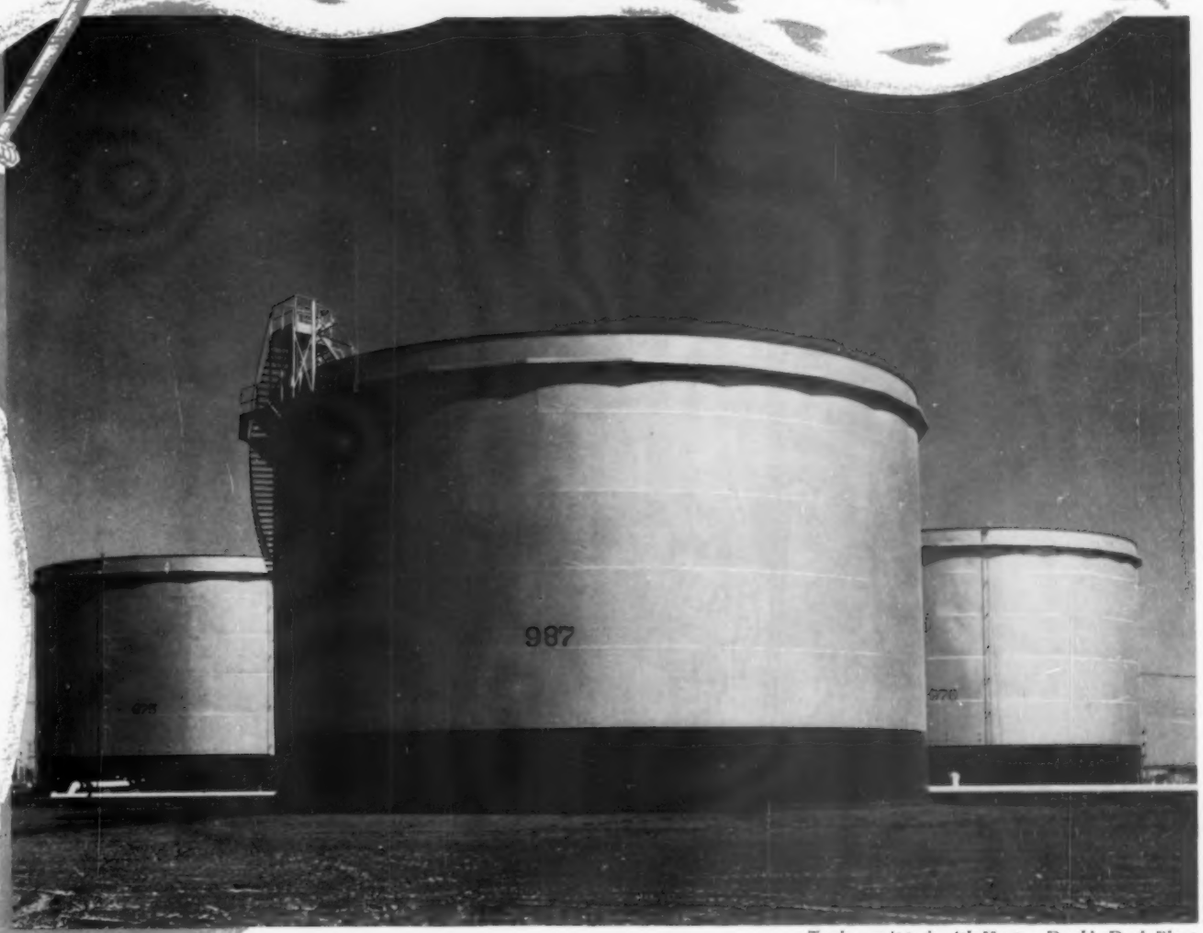


A HORTON FLOATING ROOF *is King . . .*



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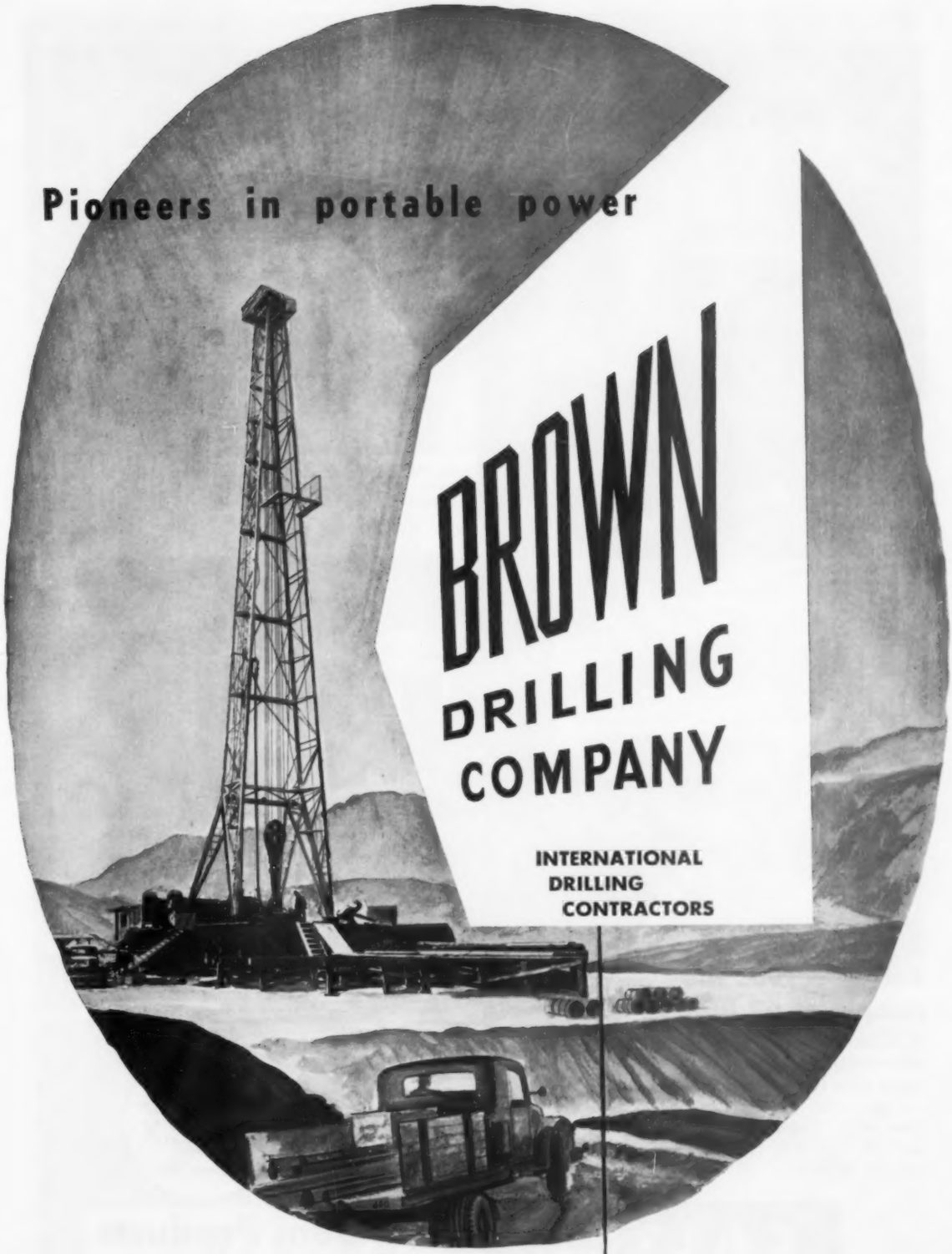
Pioneers in portable power



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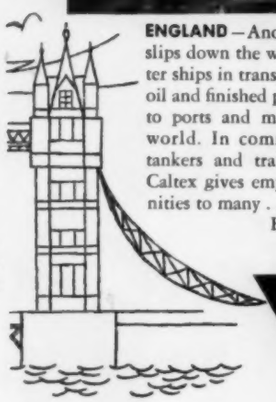

ENGLAND—Another Caltex tanker slips down the ways to join her sister ships in transporting vital crude oil and finished petroleum products to ports and markets of the free world. In commissioning these tankers and training their crews, Caltex gives employment opportunities to many . . . helps strengthen England's economy.

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Caltex serves the people of 67 lands

In 67 lands, across half the world, through such developments as these, Caltex is able to supply better fuels and lubricants for industry, for agriculture, and for motoring millions. These require a continual investment of funds and skills, backed by a faith in a better future for free nations.

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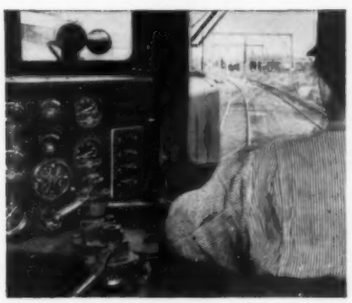

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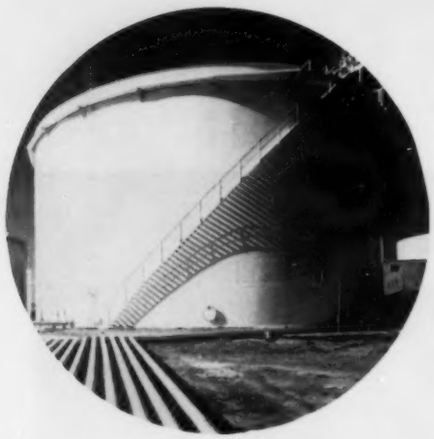

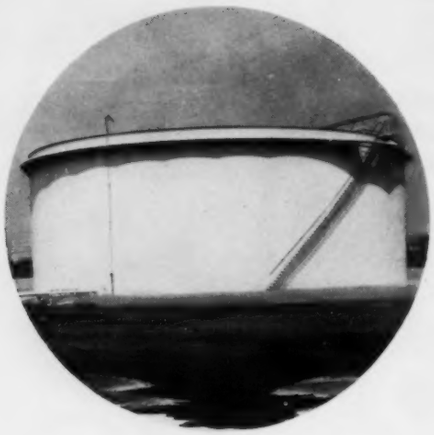

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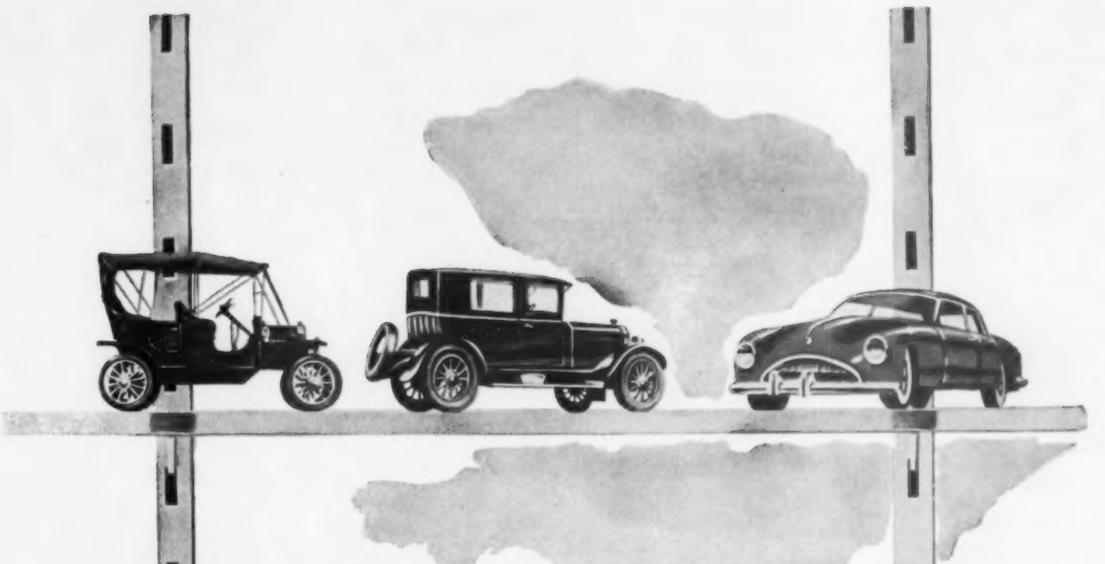

what a change... in gasoline!

Some of the biggest changes in the constantly changing automotive field are the hardest to see—the changes in gasoline. Actually, there have been great improvements in gasoline over the years. Except for the introduction of tetraethyl lead in 1922, most of the changes have come through improved refining methods.

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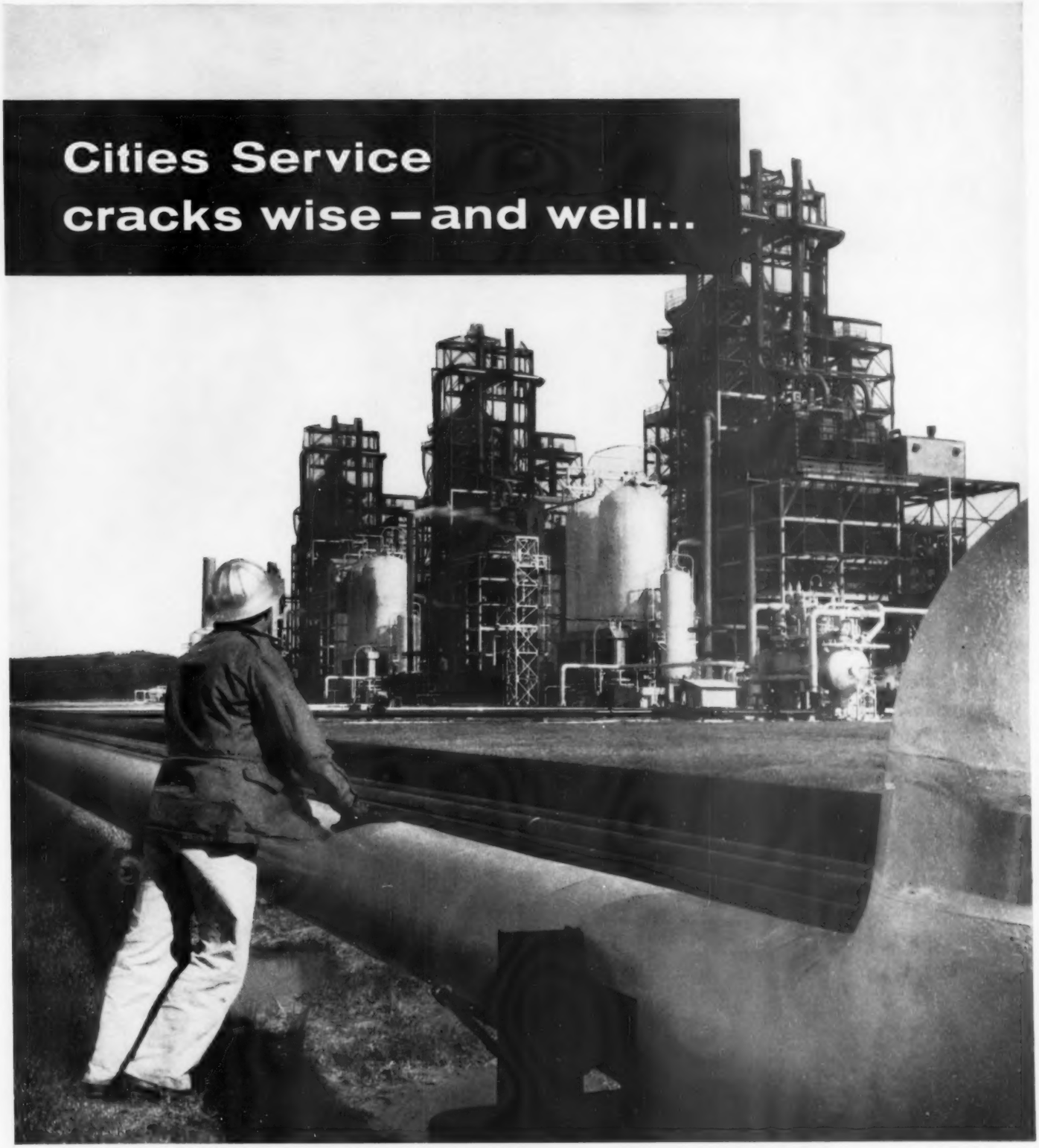

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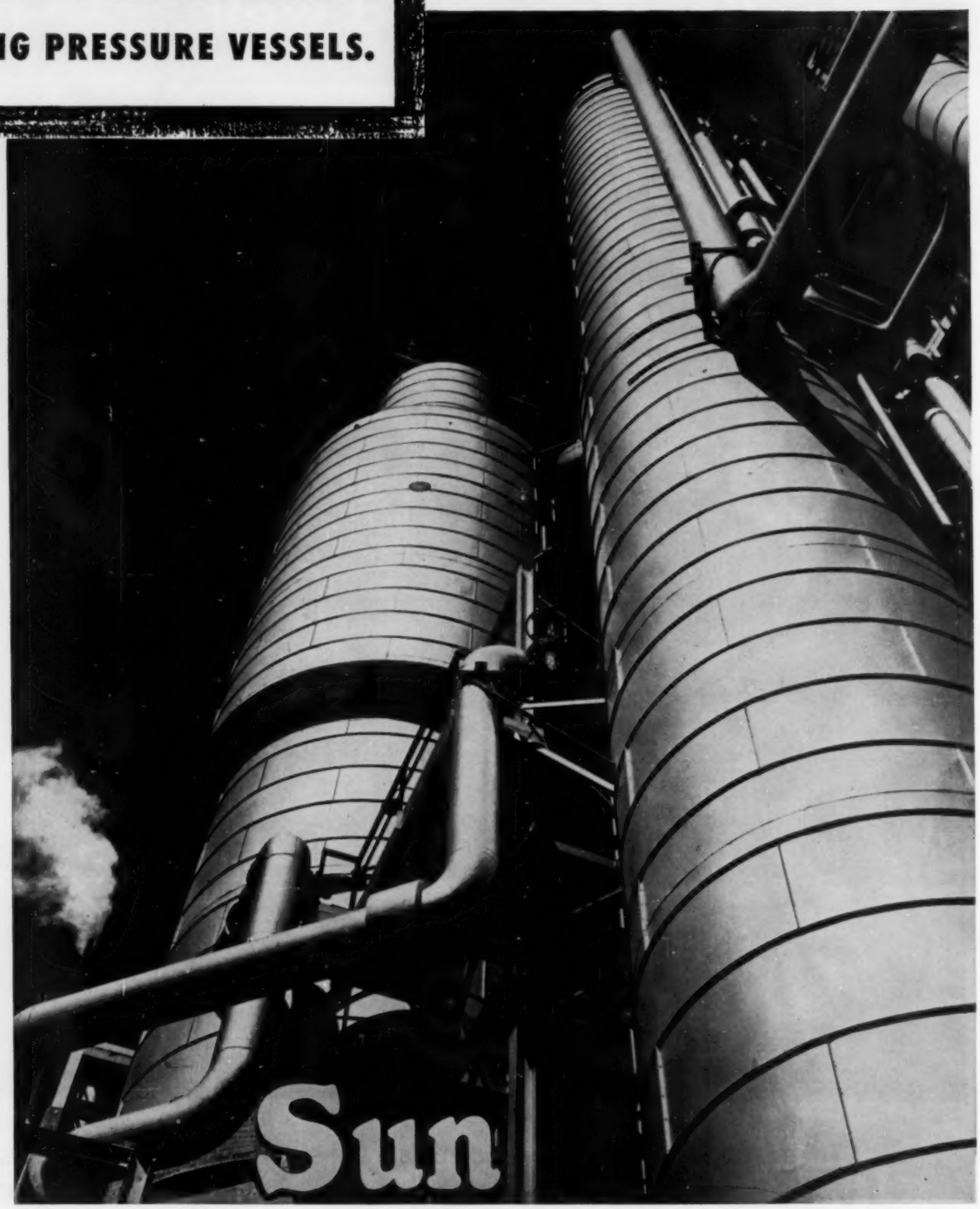

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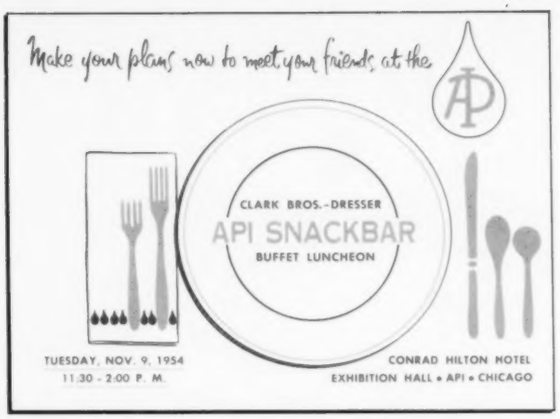

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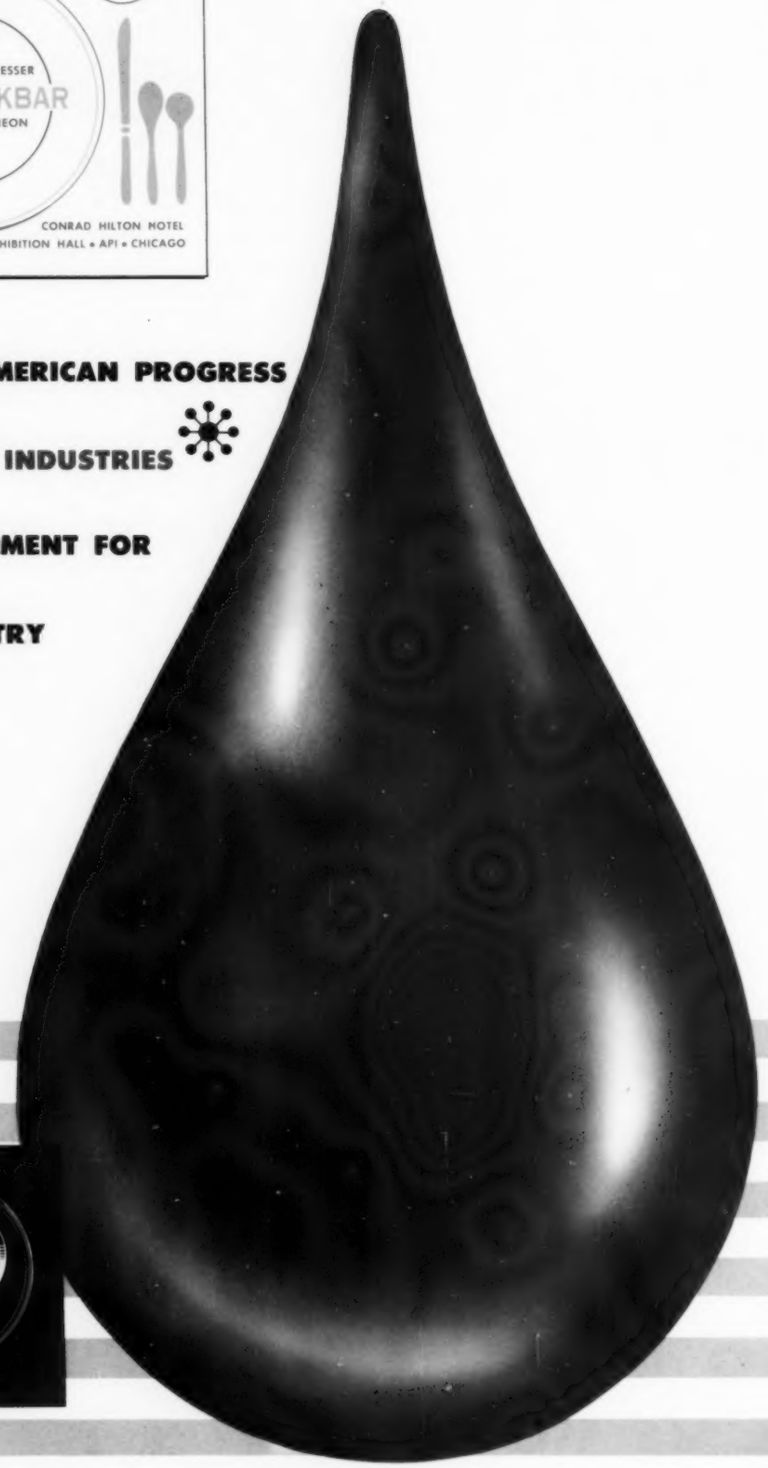

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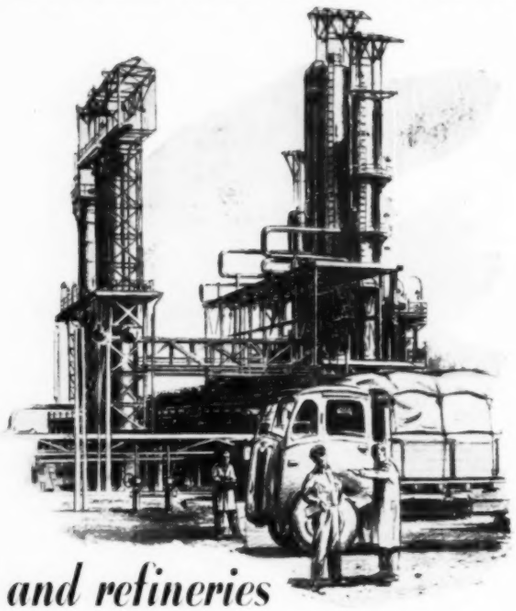

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Whenever a power drive is needed, there is a BTH motor that will do the job efficiently and economically. In industries all over the world, BTH motors are helping to increase production. Over half-a-century's experience of this branch of electrical engineering enables BTH to offer the motor with the mounting, enclosure, rating and performance best suited to the application.

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The Texas Company

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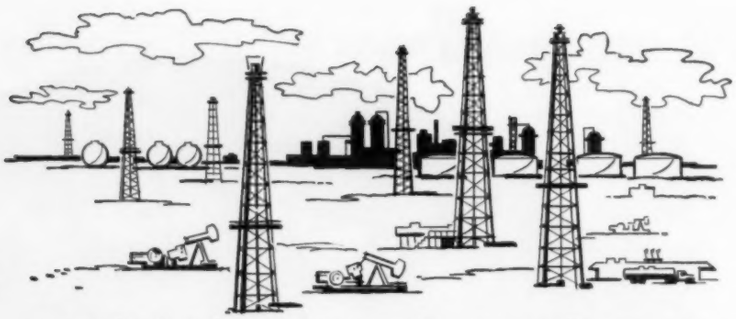

Oil field favorites...for **good** reasons

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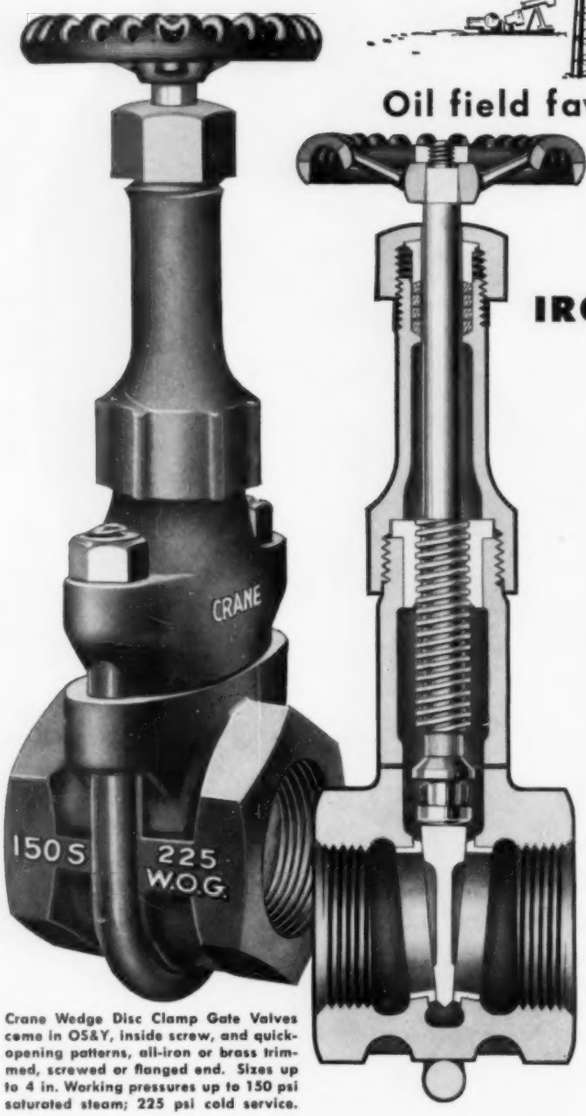
IRON BODY—WEDGE DISC

clamp gates



Crane Wedge Disc Clamp Gate Valves come in OS&Y, inside screw, and quick-opening patterns, all-iron or brass trimmed, screwed or flanged end. Sizes up to 4 in. Working pressures up to 150 psi saturated steam; 225 psi cold service.

Versatile valves—excellent for crude, fuel, and lubricating oil—for air, gas, and gasoline. And use them too for steam, hot and cold water . . . even for corrosive chemicals and gasses. Your choice of regular patterns, all-iron or brass trimmed.

Dependable valves—because they're extra rugged, with a strong, reinforced body and husky stem. On inside screw all-iron valves, an improved self-draining bonnet prevents entrapment of line fluids in the bonnet—protects the threads, keeps the stem working smoothly.

Economical valves—not only in first cost, but in upkeep as well. Their compact design means a better fit for more places . . . a saving on piping in many cases. Simplified clamp construction makes quick work of normal maintenance—ideal where frequent cleanout is essential.

Ask your Crane Representative for Folder AD 1667, or write direct. Find out for yourself why Crane Clamp Gate Valves are the oil field favorite !

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

General Offices:
Crane Co.,
836 S. Michigan Ave.
Chicago 5, Illinois, U.S.A.

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Crane Ltd.,
45-51 Leman St.,
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1170 Beaver Hall Square,
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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

HAMMOND ANNOUNCES ITS TUBESEAL* SYSTEM FOR FLOATING ROOF TANKS

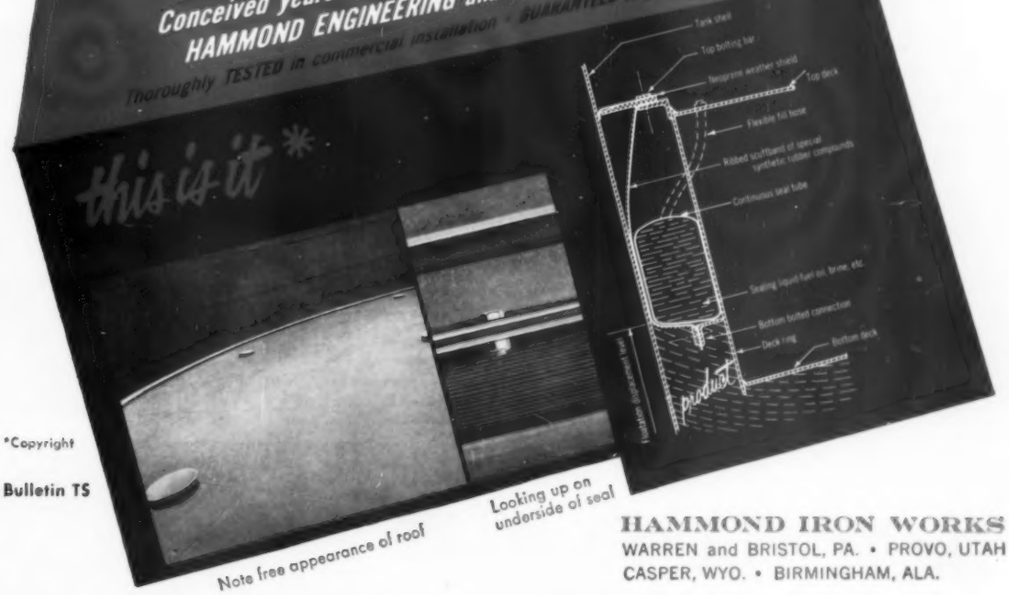
new or old—riveted or welded

THE MOST EFFICIENT AND POSITIVE SEAL KNOWN

1 no moving parts
2 no mechanical maintenance
3 overcomes tank out-of-roundness
4 climate proof
5 non-corrodible
6 can operate to bottom of tank or above the top
7 no vapor space below the seal
8 entire circumference has tight seal under pressure at all times

Conceived years ago but only made possible by combining HAMMOND ENGINEERING and MODERN MATERIALS

Thoroughly TESTED in commercial installation · GUARANTEED to your satisfaction



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ask for Bulletin TS

HAMMOND IRON WORKS
WARREN and BRISTOL, PA. • PROVO, UTAH
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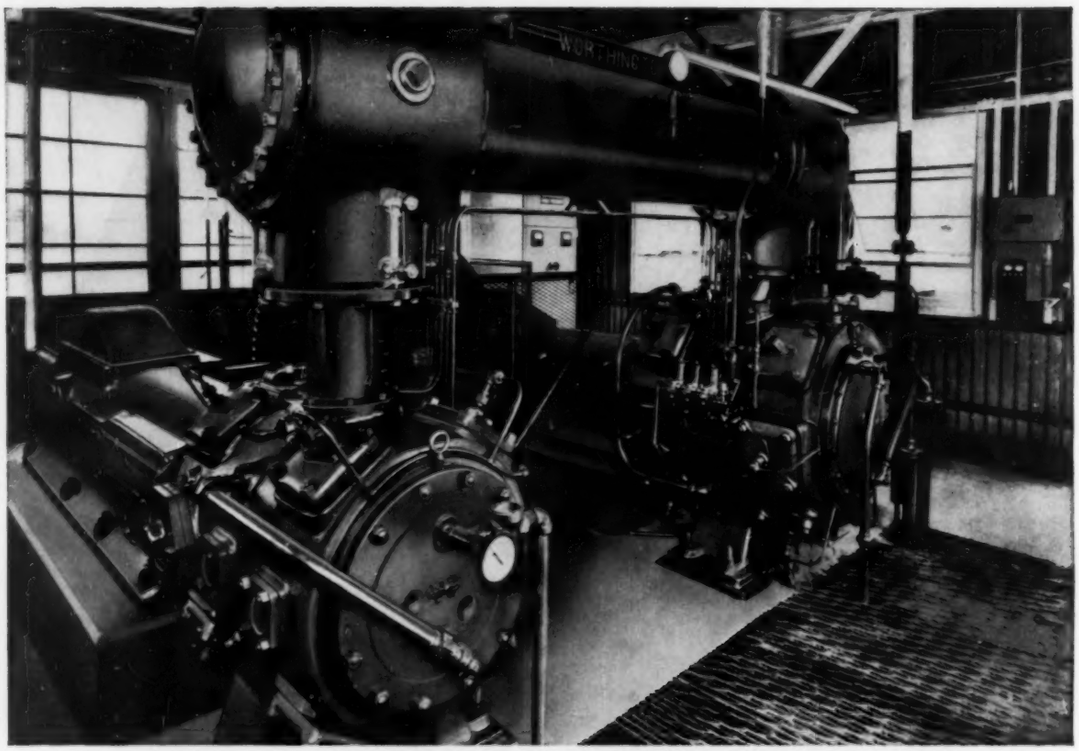

WORTHINGTON DC-2 HORIZONTAL AIR COMPRESSOR, one of 14 Worthington compressors used for various services at the Girard Point, Pa., station of the Gulf Oil Company.

THIS COMPRESSOR KEEPS PACE WITH VARIABLE LOADS

Like compressors in industry everywhere, this installation at a large eastern refinery must face many variable load problems. Unless properly handled, variable compressor loads often result in wasted power and high running costs.

Worthington Five-Step Variable Capacity Control solves this problem.

The by-pass regulation—as achieved by suction valve unloaders and clearance pocket unloaders—is exclusively Worthington and offers these important advantages:

Economy of power—the air required at any moment determines the power used.

Simplicity—inlet valves and unloading mechanism form one individual element, easily accessible.

Low operating temperatures—a cooler cylinder insures improved lubrication and low oil consumption.

This Type DC-2 compressor is also equipped with the exclusive Worthington Feather* Valve—the lightest and most efficient compressor valve available.

Write for air compressor bulletin L-675-B1B to your nearest Worthington district office or to Worthington Corporation. Export Dept., Harrison, New Jersey, U.S.A.

A GLANCE AT THE INDICATOR PANEL of the Worthington five-step governor shows operating capacity at any moment.

WORTHINGTON

The Sign of Value Around the World

Our Face is Red!

We never dreamed... that the oil industry would respond so enthusiastically to our introduction of the "Royal Scintillator." We were caught with our production down. We not only did not have enough instruments to supply the demand, we didn't even have enough catalogs. We apologize and wish to assure our customers that we are now in a position to give prompt service.

Not everyone agrees that the radiation survey technique is a proven method of oil field exploration. We agree that not enough data is available as yet, however, there is a growing body of opinion which holds that this is a valuable technique. Recent very encouraging results support this opinion.

We cannot guarantee that the Model 118 Royal Scintillator will locate oil, but we can guarantee that the Royal is the best instrument made for investigating the radiation pattern existing around oil fields. It is also the best instrument made for uranium prospecting, and its use for this purpose should not be overlooked by oil geologists.

Write now for our free pamphlet on "The Principles of Oil Field Detection with Scintillation Counters" and our complete catalog on Geiger Counters and Scintillation Counters.

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Company _____
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PRECISION RADIATION INSTRUMENTS, INC.
World's Largest Manufacturers of Portable Radiation Instruments

ELECTRIC OVERHEAD TRAVELLING CRANES

by BUTTERLEY

30 ton Butterley Electric Overhead Travelling Crane installed in the maintenance department of an important steel works.

Butterley 10-ton Electric Overhead Travelling Crane in another part of the same maintenance department.

(*Consulting Engineer*: CECIL BENTHAM, C.B.E., M.I.C.E., M.I.Mech.E., M.T.)

EC248

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The Charge		The Product	
API	62.6	API	62.6
Sulfur %	0.1	Sulfur %	0.001
RVP	8.1	RVP	12.0
ASTM Over	95	ASTM Over	87
End Pt.	370	End Pt.	385
CFRR Octane Clear	54.0	CFRR Octane Clear	80.6
		3cc	94.6
		C4 Plus Yield, Vol. %	95.5

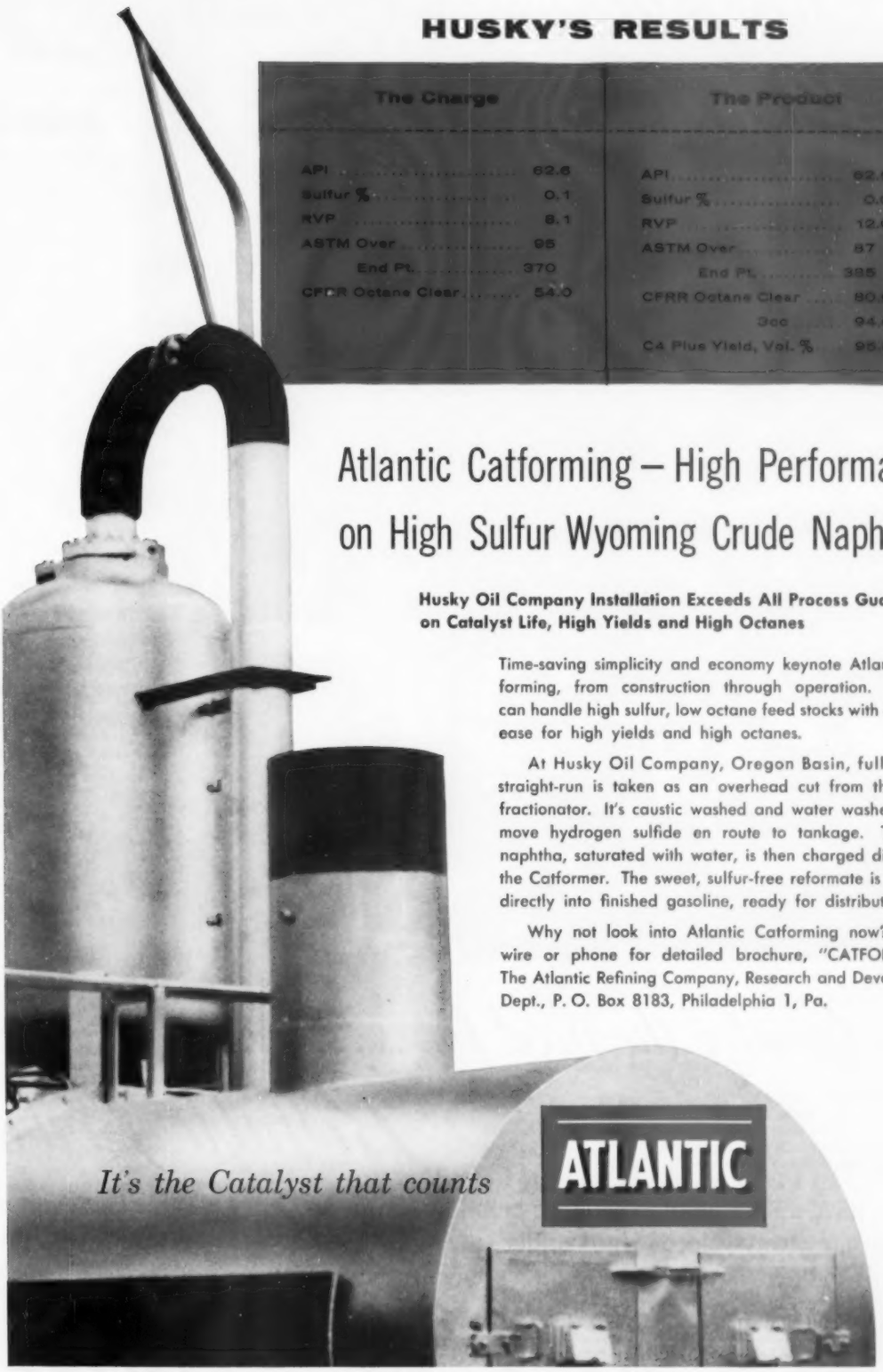
Atlantic Catforming – High Performance on High Sulfur Wyoming Crude Naphthas

Husky Oil Company Installation Exceeds All Process Guarantees on Catalyst Life, High Yields and High Octanes

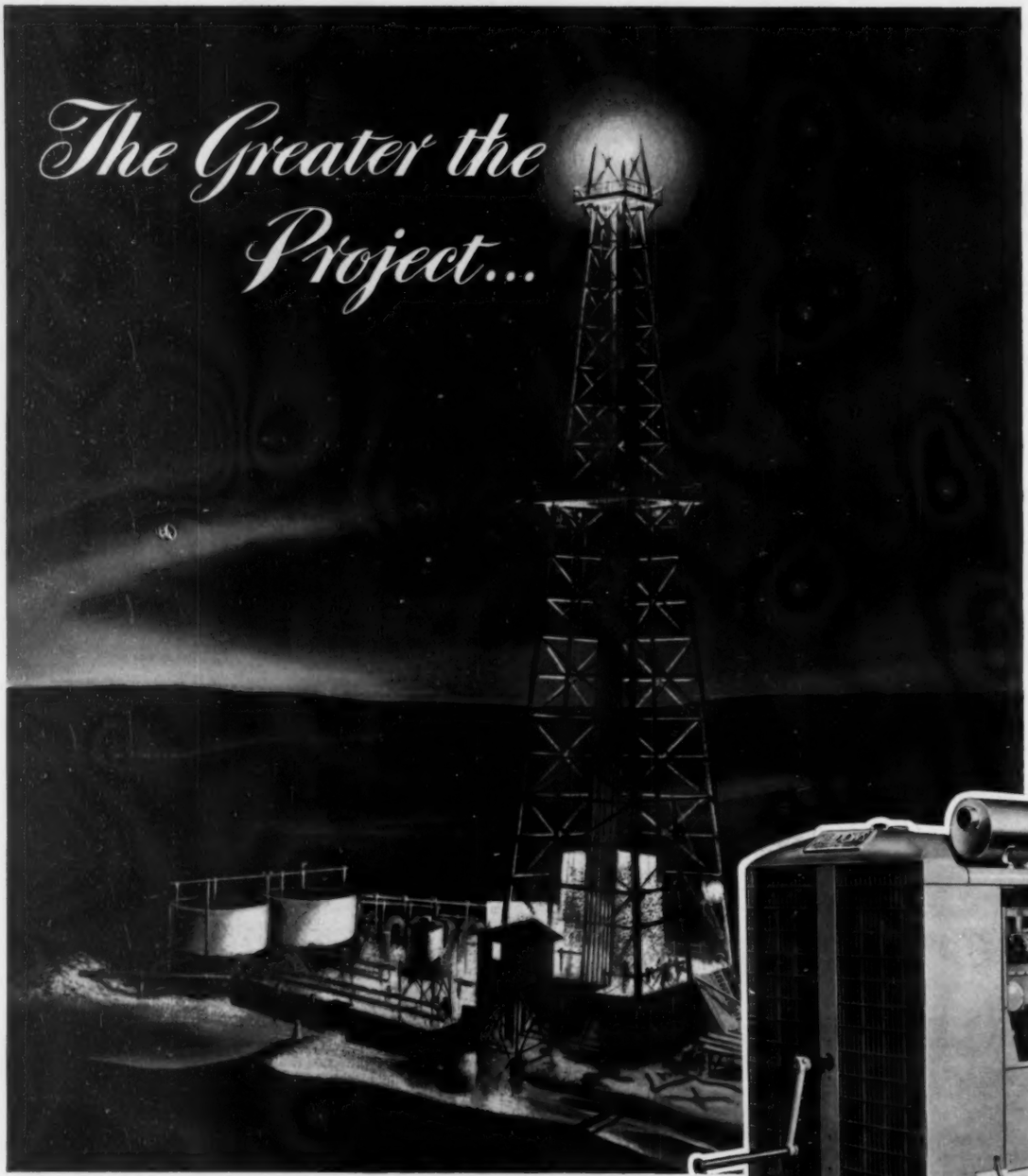
Time-saving simplicity and economy keynote Atlantic Catforming, from construction through operation. Refiners can handle high sulfur, low octane feed stocks with one-step ease for high yields and high octanes.

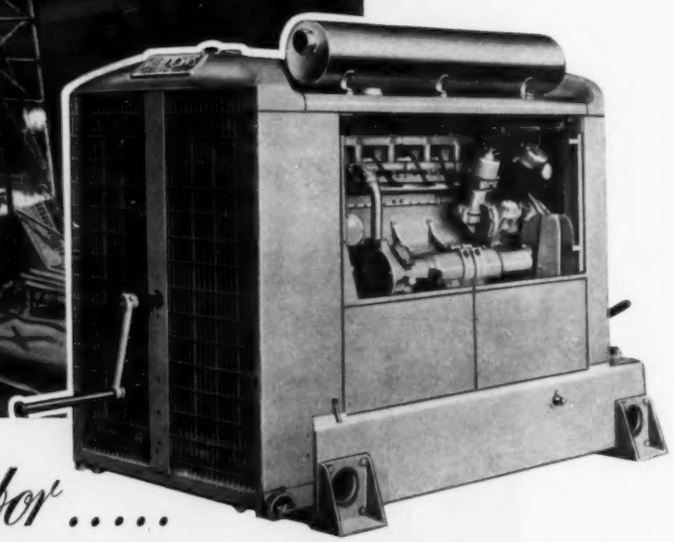
At Husky Oil Company, Oregon Basin, full-boiling straight-run is taken as an overhead cut from the crude fractionator. It's caustic washed and water washed to remove hydrogen sulfide en route to tankage. This raw naphtha, saturated with water, is then charged directly to the Catformer. The sweet, sulfur-free reformate is blended directly into finished gasoline, ready for distribution.

Why not look into Atlantic Catforming now? Write, wire or phone for detailed brochure, "CATFORMING." The Atlantic Refining Company, Research and Development Dept., P. O. Box 8183, Philadelphia 1, Pa.



It's the Catalyst that counts





The Greater the Need for .....

Reliable Power

Illustration shows Meadows 6GJ630 natural gas engine in self contained power plant. Developing 96 B.H.P. at 1600 R.P.M., this power plant is suitable for direct-coupled or belt driven equipment. Similar units are offered for operating on diesel fuel or gasoline.

Meadows have a lifetime of experience behind them in providing reliable and economic power in far away places and under the most arduous conditions. As prime movers for oilfield equipment Meadows engines have been proved.

Manufacturers of natural gas, gasoline and diesel engines ranging from 30—300 B.H.P.

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An Associated British Engineering Company

DU PONT

PETROLEUM CHEMICALS DIVISION
NEWS

DU PONT

CONTINUED *"The Windshield"*

this important project.

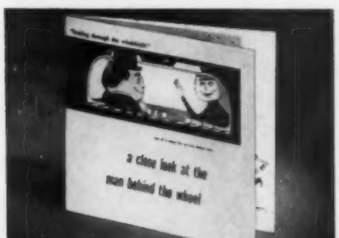
"Looking through the windshield" is the theme of a new series of folders for your dealers. Each of the folders in the series discusses a specific phase of service station business . . . (1) the customer himself, (2) "regular" and "premium" purchases, (3) use of credit cards, (4-5) oil and TBA buying habits, and (6) free dealer services.

Each is a 4-page folder with an intriguing *cutout* "windshield" looking through the front cover into the inside of the folder at the dealer. The folders achieve an interesting three-dimensional effect as a result of this unusual art treatment.

They are based on information uncovered by Du Pont's recent extensive survey of consumer gasoline buying habits. But they explain each point in simple, straightforward language that can be readily understood and easily remembered by any dealer or service station attendant.

"A close look at the man behind the wheel" is the title of the first in the series. What your dealers know about this "man behind the wheel"—can have an important bearing on sales and profits . . . for both you and your dealers.

The average motorist, for example, is loyal to one station—and buys at least 75% of his gasoline there. The folder points out, therefore, that the more a



THE "WINDSHIELD" THEME is effectively dramatized in each folder by a die-cut through the cover page—which shows the dealer looking out from an inside page.

dealer can do to increase customer *loyalty*, the better his business will be. But *how* can he do this? . . .

If the customer is under 35, the chances are that *friendship* is the basic ingredient in his loyalty. Motorists over 35, on the other hand, tend to base their loyalty more on the kind of *service* they receive.

Although subtle, these are important points for every dealer to know and understand. And this new folder helps him to understand them in terms of his own cash register.

Quantities of "A close look at the man behind the wheel," the first in this series are now available for distribution to your dealers. Any Du Pont Petroleum Chemicals Division representative or regional office will be glad to give you sample copies . . . and cost information for ordering them in large quantities.

"MAGIC BARREL" ON EUROPEAN TOUR

On October 4, two representatives of the Petroleum Chemicals Division, R. Carter W. Jones and Roberts W. Brokaw, took off for Europe—each with a "Magic Barrel."

They are taking part in a 6-week European tour sponsored by the National Sales Executives, Inc. Its aim is to acquaint European businessmen with American methods of selling. The "Magic Barrel" was picked to be included in the tour as an example of a unique and interesting method of selling an industry to the general public.

When the tour is concluded in Paris on November 13, the "Magic Barrel" will have been seen by audiences in 27 major cities of 20 European countries.

In addition to the Du Pont men, the Sales Executives group includes representatives from 10 other American companies.

New Phase of Antiknock Research Discussed in Paper

Engines are now being operated on hydrogen and carbon monoxide at the Du Pont Petroleum Laboratory. The operation is part of the Laboratory's extensive antiknock research program.

This work was recently discussed in a paper presented at the west coast meeting of the Society of Automotive Engineers by Dr. B. M. Sturgis, who co-ordinated the project at the Petroleum Laboratory.

The paper, one of the most comprehensive on knock and antiknock action to be presented since the end of World War II, brings out several significant findings. For example, the Du Pont experiments helped to determine what similarities exist between hydrogen combustion and hydrocarbon combustion. And experiments with carbon monoxide showed that water vapor, which could not be eliminated from the fuel-air mixture, entered into the combustion process to produce knock.

This lends further support to the theory that knock reaction may be related to the presence of simple hydrogen and oxygen containing radicals . . . and that tetraethyl lead inhibits knock by suppressing the action of these radicals.

A copy of the paper can be easily obtained from any of the Petroleum Chemicals Division regional offices listed below.

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. . . through Chemistry
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LOS ANGELES, CALIF.—612 So. Flower St. . . . . Phone MAdison 5-1691
IN CANADA: Du Pont Company of Canada Limited—Petroleum Chemicals Division, 80 Richmond Street West, Toronto 1, Ontario
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A-8173

Printed in U. S. A.

PETROLEUM CHEMICALS DIVISION
NEWS

November ★ One of a Series of Interest to the Petroleum Industry ★ 1954

Du Pont announces

NEW TYPE LUBE OIL ADDITIVES to solve low-duty sludge problems

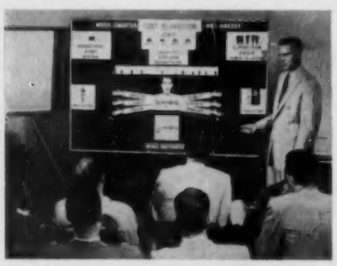
New Du Pont Lube Oil Additive 564 and Lube Oil Additive 565 are both polymeric additives. Both are outstanding detergents and viscosity index improvers. They are exceptionally effective in retarding sludge formation under stop-and-go driving conditions.

Different molecular weights distinguish the two additives. Now available in commercial quantities, they can be used in extremely low concentrations with substantial dollar savings over the use of conventional additives.

NEW "SHOW" HAS MILLION-DOLLAR PLOT

Here's a "show" that will never hit Broadway . . . but you won't want to miss it.

It's the Du Pont Cost Reduction Show. It's based on a systematized method of reducing costs which our company has developed over many years of manufacturing experience. Since it has proved so effective in our own plants—resulting in savings running into millions of dollars—we thought some of our friends in the oil industry would like to have us review it for them.



THIS FLANNELBOARD DISPLAY is part of the 40-minute Du Pont Cost Reduction Show.

Dramatic presentation

To get over the key points quickly and dramatically, we have organized the story into a three-part presentation . . . including a flannelboard talk, a motion picture, and a slide presentation.

Du Pont's program is certainly no magic formula that works miracles. It is, however, unique with respect to its formalized organization, and the high degree of employee participation it has accomplished. The key to its success is the development of a cost-conscious attitude in the minds of *all* employees.

Work smarter . . . not harder

The Cost Reduction Show describes how work simplification training and a suggestion plan are integrated into the program. The functions and value of a full-time co-ordinator, and his role as an aid to line organization are discussed in detail. Emphasis is placed on promotion of the program to a point where cost reduction becomes a *work habit* . . . and helps to improve human relations as well as efficiency.

A number of Du Pont men in various parts of the country are now being trained to put on the show for the oil industry. Showings are limited to oil company offices and refineries. For more details about the Cost Reduction Show, we suggest you get in touch with one of the Du Pont Petroleum Chemicals Division regional offices.

"Looking through the windshield"

Looking at each other through the windshield is where dealers and motorists first meet. Du Pont can help your dealers get better acquainted with customers through a series of clever little folders called "Looking through the windshield."

What the motorist sees through his windshield when he stops for gasoline spells the difference between a successful service station . . . and a business that is just getting by. This fact is mighty important to every one of your dealers. But how many of them use it to their own advantage?

THIS CUSTOMER'S EYE-VIEW can spell the difference between success or failure for a service station business. A new series of Du Pont folders can help your dealers give their customers a "better" view.

The chances are that if your dealers could get a better understanding of their customers, they would, in turn, be better prepared to give these customers a favorable impression of the service station. Here's how the Du Pont Petroleum Chemicals Division can help you with

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

DAVISON M-S® Catalyst

The Petroleum Industry's MOST WIDELY USED CATALYST!

- Narrow range of particle size distribution
- Low impurities
- Outstanding physical and catalytic characteristics
- Excellent attrition resistance

These are some of the reasons why Davison's Catalysts are the most widely used synthetic cracking catalysts in the petroleum industry. Throughout the world, Davison's catalysts crack more gas oil than any other catalyst.

Write today for a folder giving all the facts on Davison's M-S Catalysts . . . particle size distribution, chemical, physical and catalytic properties, etc.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland
Sales Offices: New York, N. Y.; Chicago, Ill.; Houston, Texas

Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole Producers of DAVCO® Granulated Fertilizers.

Crane Development Series—I

Four years ago, in London, we staged a special combined Demonstration-Exhibition-Press Conference, in order to introduce a range of products which we designated CF2. CF2 is the recurring formula of a polymerised plastic, at the time an entirely new material, called polytetrafluoroethylene, or PTFE as it has become known.

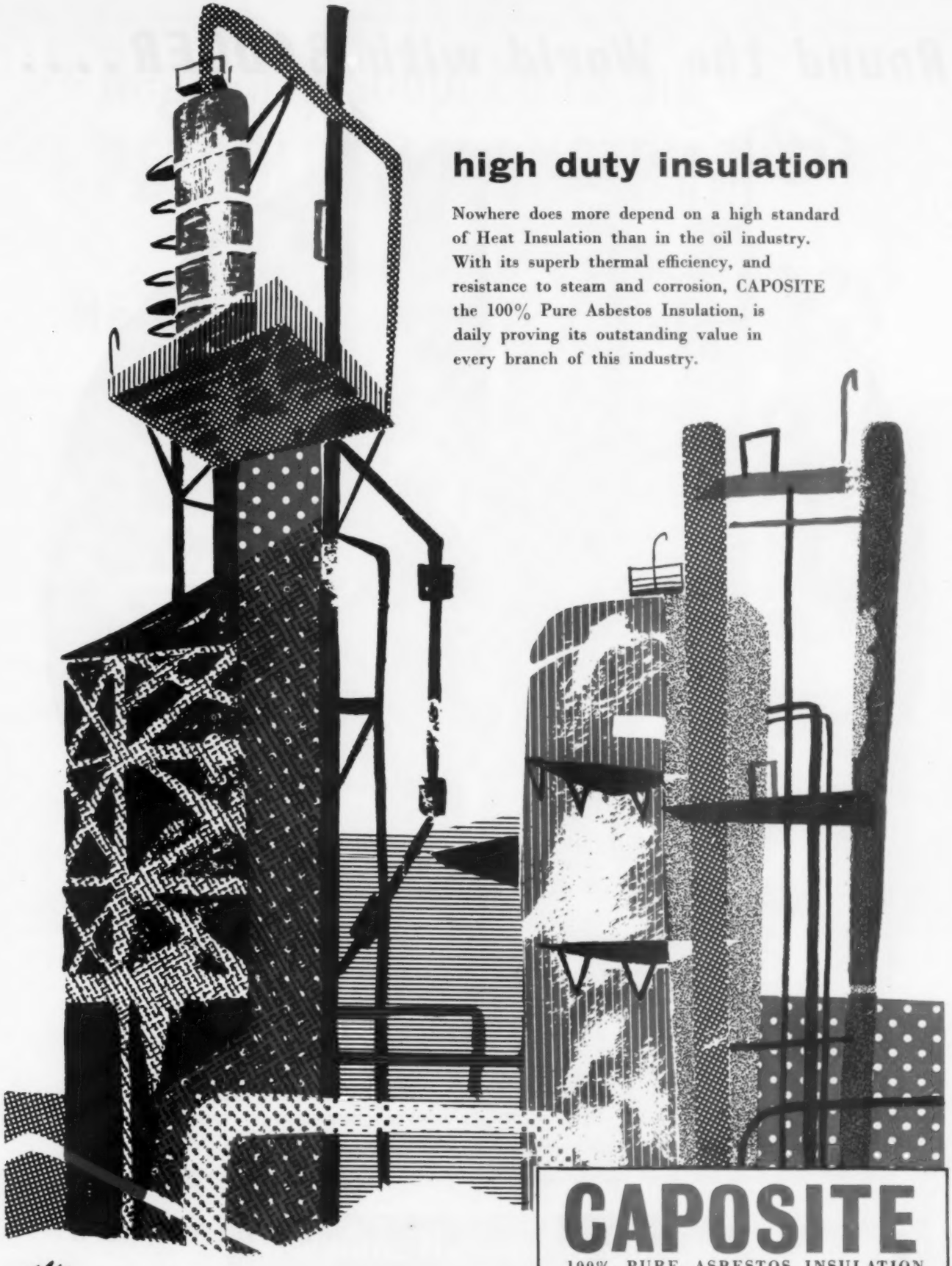
Primarily we were interested in PTFE because a range of completely chemically inert Gland Packings was very badly needed to seal against the increasingly corrosive substances being used by the Processing Industries. These Gland Packings were also required by the Chemical and allied Industries which are responsible for the manufacture of these substances. In this particular field PTFE proved itself to be a remarkable material and we have been very active in developing it in various useful forms for use by these Industries.

But, as the illustrations on this page show, this was only a beginning; since we first introduced PTFE in the form of Gland Packings we have gained considerable experience of the manufacture of various products from the basic raw material, and we have now used this material for many new, and in many cases entirely unsuspected, applications.

We are preparing a special series of pamphlets on our work in these fields. These pamphlets will be of interest to all concerned with the handling of these *problem* materials, and they will be sent to interested engineers who let us have their names and addresses.

An announcement by

Crane Packing LTD. OF SLOUGH ENGLAND
A COMPANY



high duty insulation

Nowhere does more depend on a high standard of Heat Insulation than in the oil industry. With its superb thermal efficiency, and resistance to steam and corrosion, CAPOSITE the 100% Pure Asbestos Insulation, is daily proving its outstanding value in every branch of this industry.

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In all four corners of the world Badger-built plants are turning out quality products for the Petroleum, Chemical, and Petro-chemical industries. Badger, with its completely integrated specialist organization, offers a step by step service from the basic design to the finished plant based on a sure foundation of knowledge and experience.

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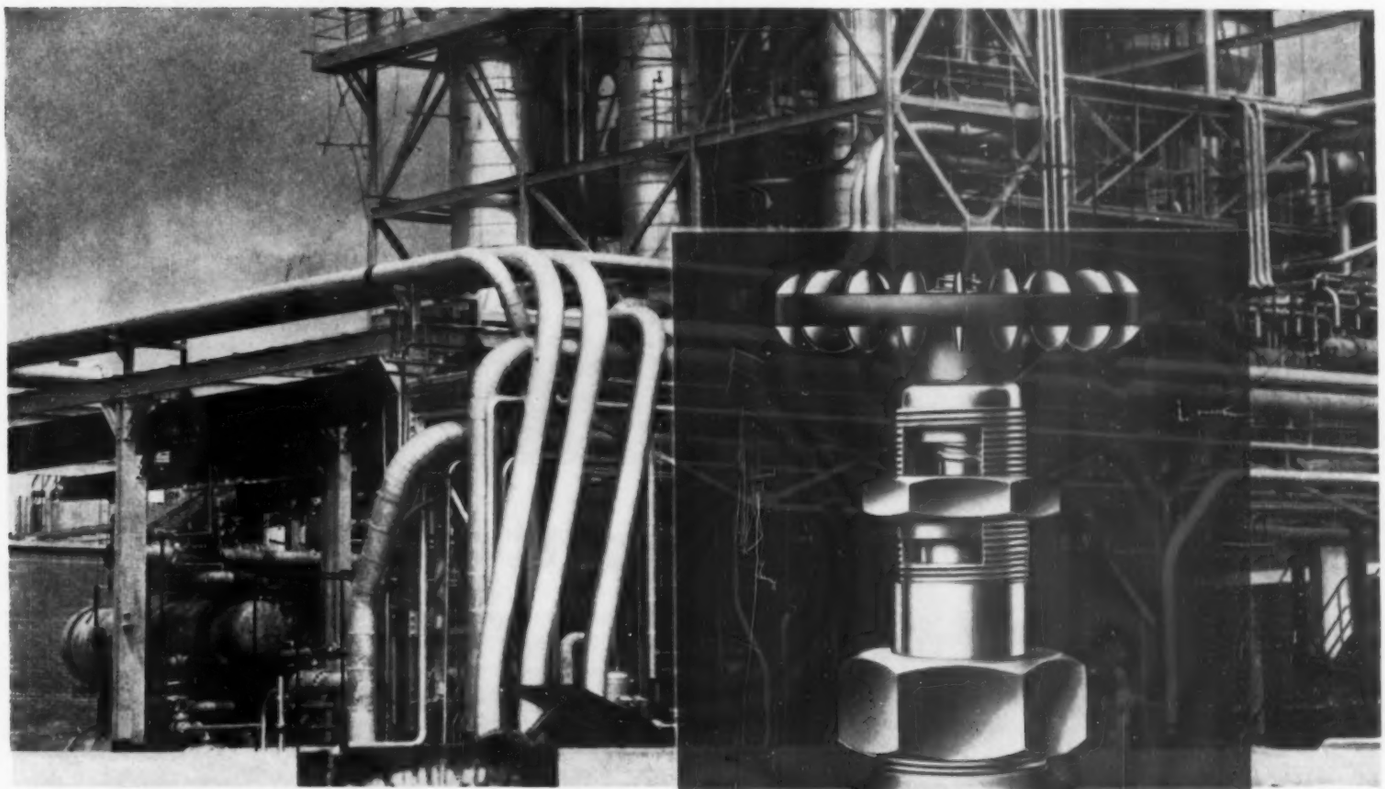
Affiliated with STONE & WEBSTER ENGINEERING CORPORATION, Badger Process Divn., U.S.A.
Process Engineers and Constructors for the Petroleum, Chemical and Petro-Chemical Industries

Regularly supplied to the PETROLEUM INDUSTRY

NEWMAN-HENDER *valves*



A SHELL PHOTO

FORGED STEEL GATE VALVE. No. 1636
Available for Working Pressures of 600 lbs. and 900 lbs. at 900° Fahr. and in the following sizes:—
¼", ⅜", ½", ¾", 1", 1½", 2".

Alternative ends as follows can be supplied:
Screwed Ends Ball Joint *(illustrated,)*
Socket Weld Ends Ball Joint,
Screwed Ends Gasket Joint,
Socket Weld Ends Gasket Joint.

Newman, Hender & Co. Ltd
WOODCHESTER GLOS. ENGLAND

..only part of the picture

OIL REFINERY ENGINEERS know that Newalls bring more than materials to the site, because they realise that even first class insulation materials cannot do justice to themselves unless they are efficiently applied. In fact, the task of planning that the right materials are used is a job studied carefully by Newalls before their recommendations are submitted. Through consultation with Newalls you can make very certain that method as well as materials is brought to bear on the problem. That's maybe why Newalls record of refinery insulation jobs makes such an impressive picture.

RECENT CONTRACTS **Among the large petroleum projects to which Newalls have supplied insulation materials recently are the Anglo Iranian Oil Company's new refineries at Aden and Kwinana and also the new Brazilian State Refinery at Cubatao, Brazil.**

Where there's a ***HEAT INSULATION*** *problem there's a job for* **Newalls**

NEWALLS INSULATION CO. LTD. *Head Office:* Washington, Co. Durham, England. *A member of the* TURNER & NEWALL ORGANISATION
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REFINEMENT *IS THE* KEYNOTE

From THORNCLIFFE

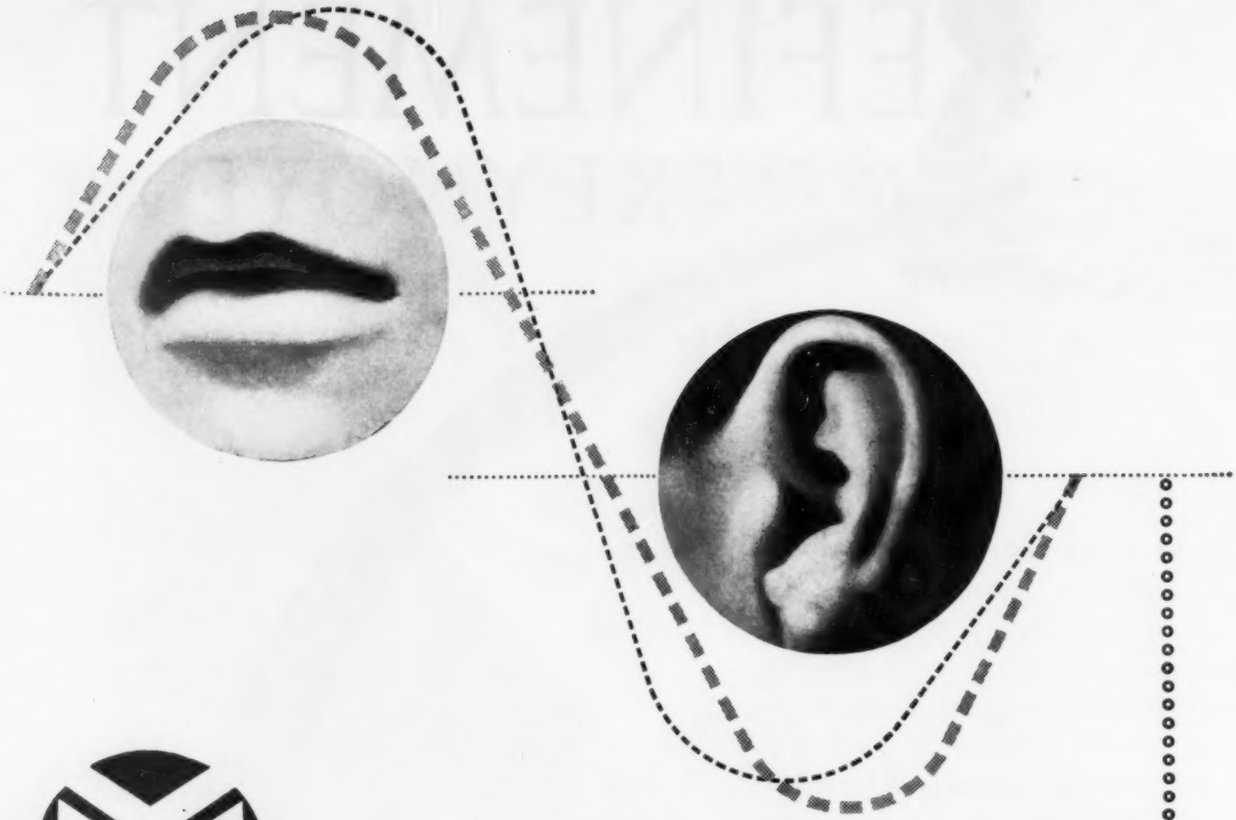
Across the world, discerning refinery and process engineers recognise the technical skill and craftsmanship which Newton, Chambers bring to the making of specialised plant. At Thorncliffe, whilst keeping abreast of tomorrow's trend in technique, we refresh ourselves constantly from a back-log of experience spanning 160 years, and more, of service in the engineering field.

This is a Stripping Tower for one of the Aden Crude Topping Units and has been constructed to A.P.I. A.S.M.E. Code. It has a diameter of 5'6", its overall length is 62'2", and it weighs 17 tons. (Photograph by permission of Messrs. E. B. Badger & Sons Ltd., and Anglo-Iranian Oil Co., Ltd.)

To ADEN

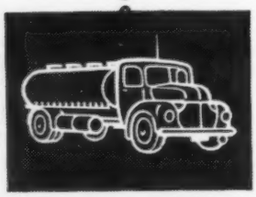
NEWTON CHAMBERS

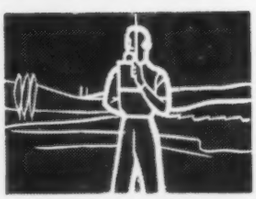
& CO. LTD. THORNCLIFFE Nr. SHEFFIELD, ENGLAND

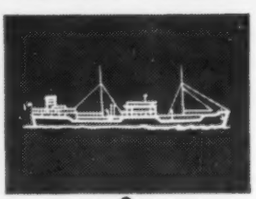


RADIO-TELEPHONE SCHEMES

In more than fifty countries Pye V.H.F. Radio-Telephones are providing an economical and reliable means of instantaneous communication between fixed points, between mobile units, and between fixed points and mobile units. Over two-thirds of the equipment in use in Great Britain alone has been produced by Pye. The Pye Systems Department will be pleased to advise you on your communications schemes whilst Pye agents and representatives overseas will demonstrate, install and maintain the equipment.







Telecommunications

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Refinery Poison

Photomicrograph by J. G. Suthard

Salt crystals in crude oil, magnified 70X, look like this. Regardless of how they look, they're poison in your charging stock . . . they'll evolve into corrosive HCl; they'll plug tower trays, condensers and exchangers; they'll salt-up furnaces and heaters. In a refinery, they're strictly poison.

But salt doesn't have to be poison

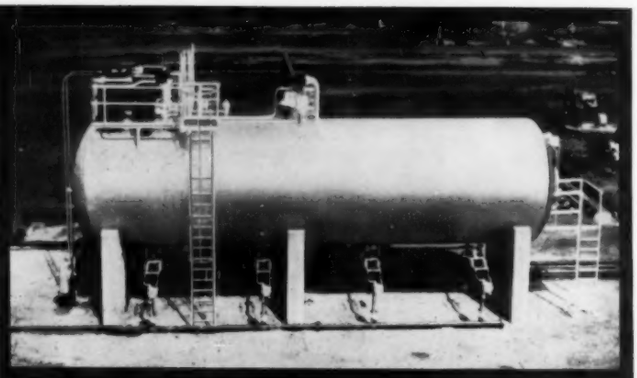
PETRECO

ELECTRIC DESALTING

keeps it out, along with non-filtrable solids and other impurities

D54-3

The photomicograph on the reverse of this page was taken as a phase of the Petreco research program; a program dedicated to a continuing battle against salts in crude oil, and to the elimination of troubles and problems derived from them. At Petreco we believe that these many years of research effort directly benefit our customers, and in a broad sense, the entire refining industry. Petreco pioneered electric desalting and has spent countless man hours on process development and improvement. Doesn't it stand to reason then, that in desalting, your best buy is Petreco?



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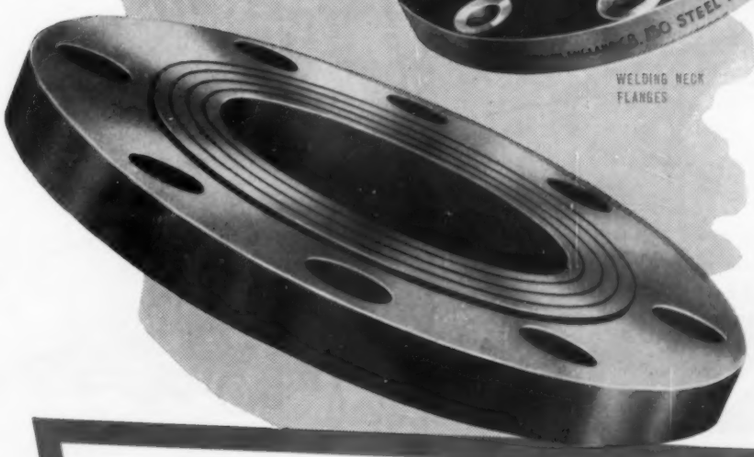

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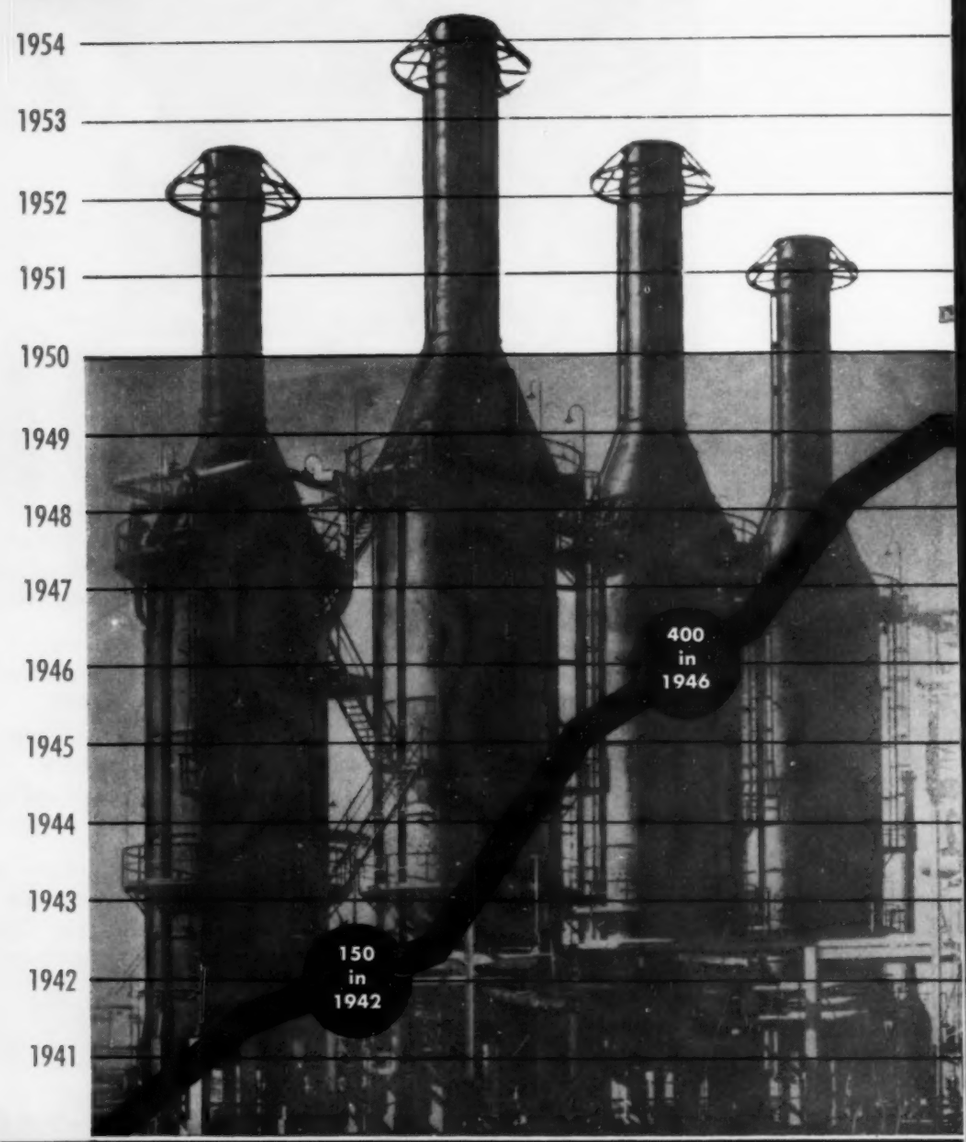

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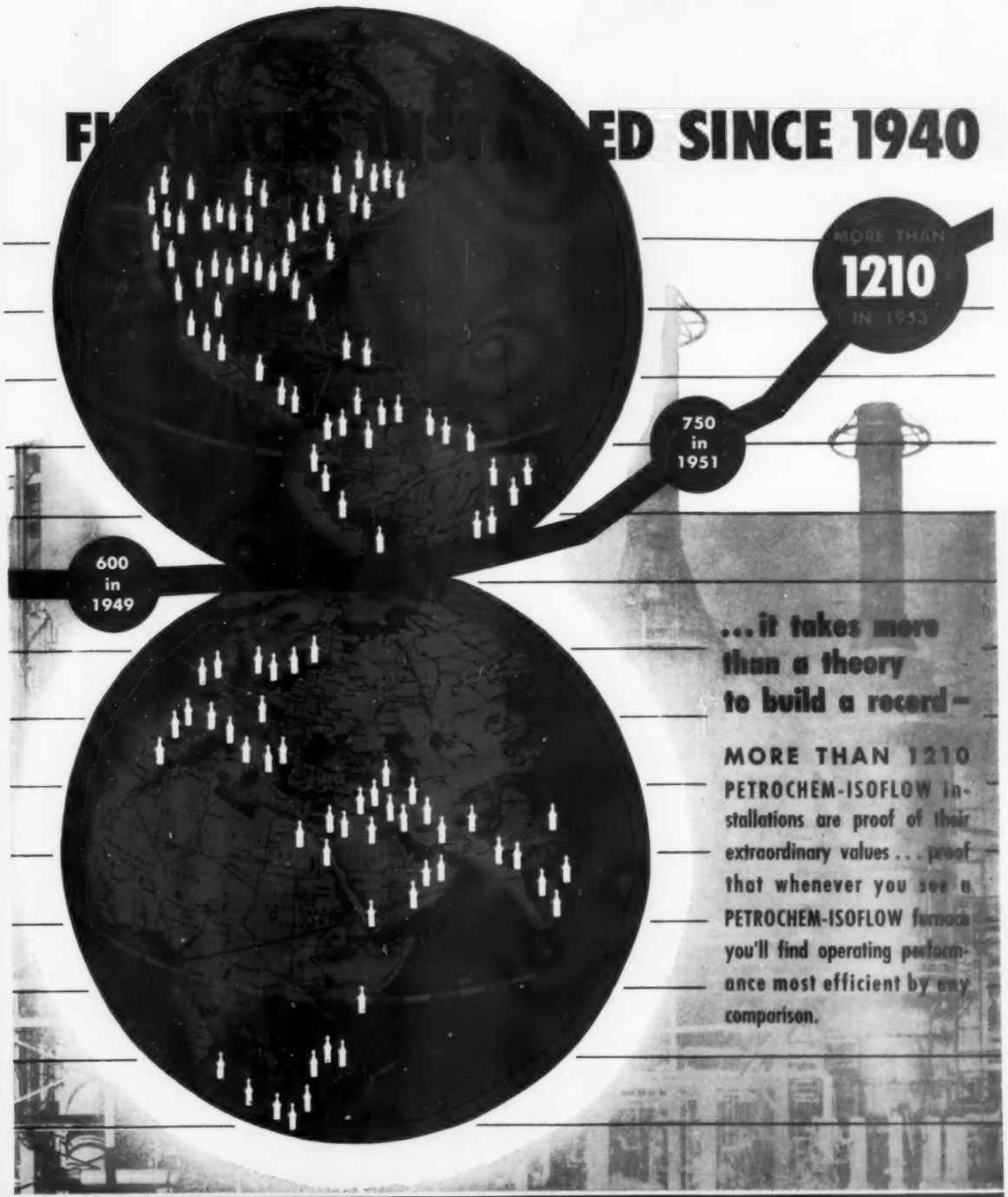

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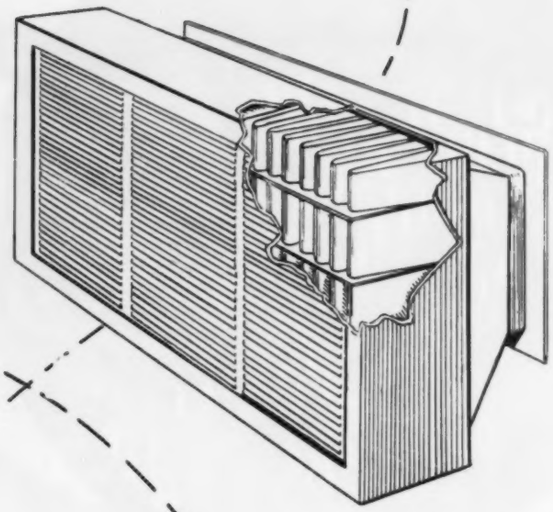

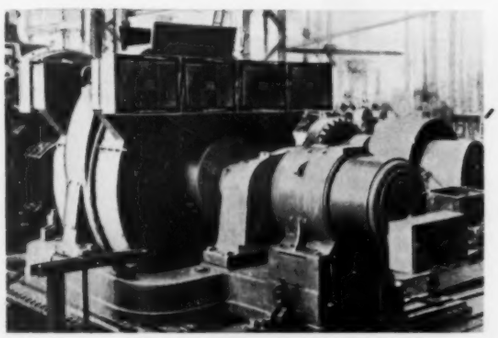

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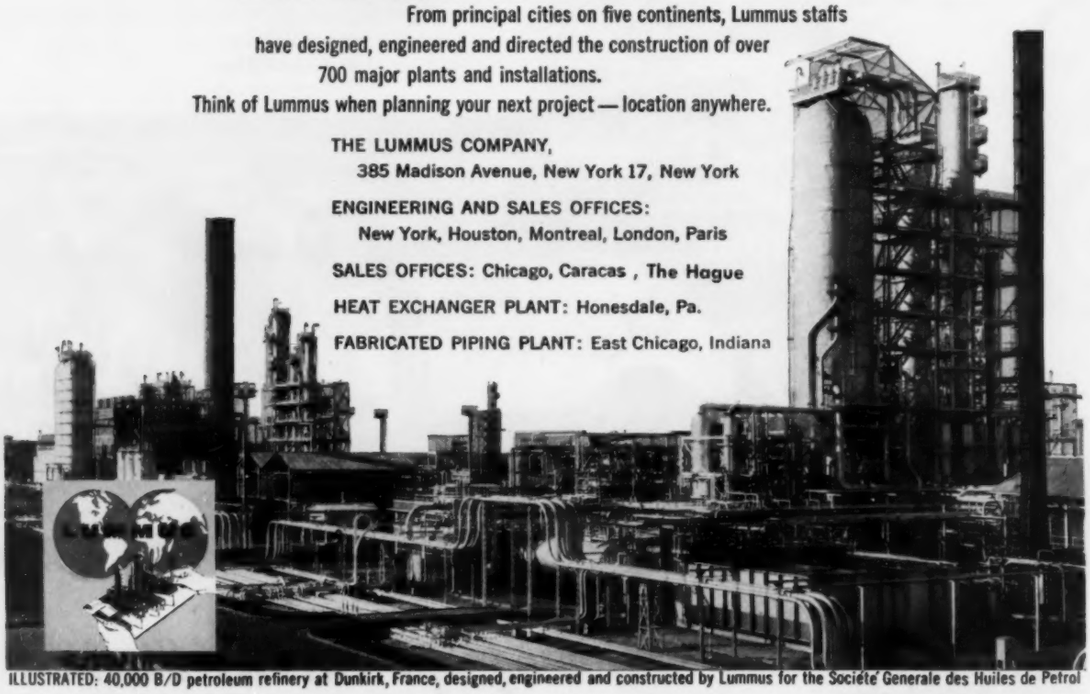

ILLUSTRATED: 40,000 B/D petroleum refinery at Dunkirk, France, designed, engineered and constructed by Lummus for the Société Generale des Huiles de Petrol

VOL. 25, NO. 12, NOVEMBER, 1954

World Petroleum

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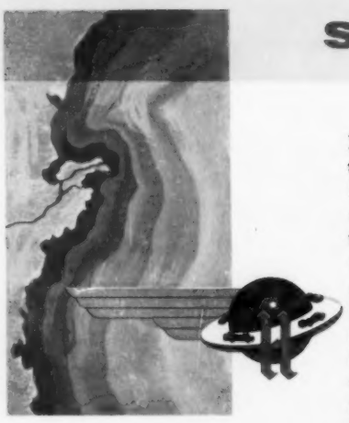
THIS MONTH'S COVER

A golden sunset silhouettes the Orthoflow catalytic cracker at the Ponca City, Oklahoma, refinery of Cities Service Oil Company. Color plates are reproduced through the courtesy of Cities Service Company.



Seagoing Service Camp

Neptune never saw more venturesome voyagers than those who seek the treasures of the tidelands. Among the oil men and the sea, Halliburton has earned its seniority afloat through long years of service in marine operations. Halliburton approached the sea by gradual stages, first meeting the new challenge in the shallow Mississippi Delta and the Louisiana Bayou in those early years when production was still only a promise—not a fact. As rigs began to move to deeper waters, tideland techniques and facilities for cementing, testing, logging and other production improvement services became a major Halliburton project in research and practice. Presently plowing over the warm green Gulf is the new Halliburton "207", a complete, modern seagoing service camp. It is the second of three such ships to be launched this year and brings to 16 the number of vessels flying the Halliburton flag. Short wave radio is an important part of the new ship's equipment. It will bring the "207" along side your drilling barge in a matter of minutes.

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Gas production is not a public utility

A RECENT DECISION of the Supreme Court of the United States in the now-famous "Phillips Case" holds that a gas producer who sells directly or indirectly to one who thereafter transports the gas to an interstate pipe line for resale is a public utility, subject to all of the rigid jurisdictional price and operational controls of the Federal Power Commission as provided by the Natural Gas Act for interstate utility gas pipe lines.

Can you imagine the thousands of gas producers who do nothing but drill for and sell gas in the field being subjected to all of the controls of a utility company? The production of gas, of course, is no more a public utility function than the production of coal or oil, or iron or wheat, or any other commodity. I can think of no better means of drying up the gas supply in this country than attempting to subject the gas producers to Federal utility controls.

The cruel realities are that unless Congress acts immediately to reverse this court-made law, the result will be a sharply reduced supply of gas for consumers throughout the United States and, eventually, a drying up of gas supplies for interstate shipment. I know from experience, as all others in the industry know, that the producers of gas cannot exist on a six percent return on the investment in their producing properties without regard to losses incident to searching for and developing gas reserves.

Those who applaud Federal regulation of the producer do so under the mistaken idea they will get a regulated low rate for gas. Nothing could be further from the truth. It is immaterial how cheap any commodity may be if the commodity is not available for sale. The inability of the operator to make his gas available for interstate sale under utility controls is not a producers' strike. The results here predicted are based solely on the simple proposition that the search for and production of gas cannot survive under utility controls. It also follows, inasmuch as one-third of the gas going into interstate commerce is directly associated with the production of oil, that the country's supply of petroleum could be adversely affected.

Federal regulation of producers' prices for gas is a long step in the direction of socialism. If gas producers' prices are to be regulated, it logically follows that producers' prices for wheat, corn, cotton, coal, lead, zinc and all other basic commodities should also be regulated. This great country of ours did not attain its world leadership in a strait-jacket of price regulation. The only assurance for a continued supply of oil and gas is the economic freedom to search for and develop new underground reserves under our traditional system of competitive enterprise.. The liberty we cherish to produce and sell in a free market has given us the best way of life known.

Frank M. Porter

President, American Petroleum Institute

Condensed from an address before the Texas Mid-Continent Oil & Gas Association, October 6, 1954.

Energy markets in a changing world

P. C. Spencer, president, Sinclair Oil Corp., and chairman of the board of directors of the American Petroleum Institute.

By P. C. Spencer

THE MOST STRIKING phenomenon of our times is the increasingly rapid pace at which changes are taking place in so many fields of activity which vitally affect the lives of men. We have always had changes, to be sure, but never before have we been confronted with the present stepped-up rate of change—deep, disturbing changes which in some instances shake the very foundations of our vaunted civilization. They affect not only our industry, but all others as well, solving some problems in the process, but often aggravating old ones or creating new ones.

In the field of national defense and national security, changes of most serious consequences have occurred, spreading out into every other field of activity. The atom bombs which were dropped on Nagasaki and Hiroshima during World War II wreaked death and destruction on a scale never experienced before, but those bombs were mere playthings compared to what we have ready for the war of tomorrow. In addition, we now have to consider many other instruments and methods of destruction.

In areas other than defense we are also witnessing spectacular changes, all of which will have some bearing, one way or another, upon the oil industry. Among other things, man can expect to enjoy better health, better food and longer life, thanks to the outstanding advances in medicine, surgery and food production.

Tremendous strides have been made in increasing the availability and effectiveness of fertilizers and insecticides.

Recent discoveries in photosynthesis, the process by which plants convert sunshine into food, hold great possibilities and the development of efficient methods for growing algae opens an enormous source of new food for the world.

In the field of communications the new achievements are startling.

In metals and plastics the technician, the processor and the manufacturer have produced many new and improved products.

More closely related to our industry we find many significant advances in transportation. Among these we may mention higher compression ratios for automobiles and trucks, plus many new developments for convenience and comfort in driving, such as power steering and air-conditioning. We should not overlook the great performance and potentials of diesel engines and gas turbines of which we shall hear more.

In the air we have the exciting inventions of the jet propelled plane, long-range aircraft, instrument - approach landings and new navigational aids for air and water craft, such as radar.

With respect to the actual movement of petroleum and its products, tankers are now being built of enormous size and greatly increased speed. The attractive economics of large carrying capacity are demonstrated by the fact that one of the newest, largest and fastest ships can do eight times the work of the World War I tanker.

Even more spectacular progress can be noted in pipe line transportation, where the large diameter lines with high pressures and other developments have made substantial changes in the economics of transporting petroleum and its products by pipe line.

In the producing and manufacturing operations of the petroleum industry, there also have been many developments of great significance. Rapid strides have been made in petroleum production techniques, with many new advances in geophysical exploration, offshore drilling and secondary recovery, all of which promise in time results of great magnitude.

Petroleum refining has kept fully abreast of other scientific developments. New processes have come on apace. We have catalytic reforming and a dozen new ways of achieving higher efficiency and more effective results in the refining process.

The record in the petrochemical field is truly amazing. Dozens and dozens of important chemicals or chemical intermediates have been produced from petroleum for the first time. Also, the oil industry can claim a large share of the credit for developing a much improved synthetic rubber.

Needless to say, all of these new developments and changes in technology, which have occurred in such a relatively short space of time, have had a profound effect upon our way of life, economically and sociologically. There are few industries or vocations that have not directly or indirectly felt their impact. And this applies with particular force to the oil industry of which we are a part. For example, improved processing and recovery methods now enable the refiner to produce substantially less residual products from a barrel of crude by upgrading the heavy fractions to lighter products.

As another example of the widespread and far-reaching effect a technological change can have, it may be mentioned that the automobile started out as a substitute for the horse and buggy, but it proved to be much more than that. It, and the highway systems which followed, put a whole nation on wheels and our modern oil industry was born. Some of the more recent innovations exert a counter influence. Television, for example, is proving to be much more than just a substitute for the movie. Among other things, it is exerting a great influence to keep the old family car in the garage.

In general, however, energy requirements are expanding, and meeting these needs poses a continuing challenge to the petroleum industry. In our attempts to meet the challenge we must remember that we are part and parcel of a mammoth energy business and that we face intensive competition from other energy producers. A growing number of our customers determine their purchases not by brand, but by Btu's, selecting the

energy source, be it oil, gas, coal or, in some cases, water-produced power, that will deliver the greatest number of British thermal units per dollar of cost.

Total energy supply rose from 15,454,000 b/d of crude equivalent in 1946 to 19,062,000 b/d in 1953, an overall gain of 23.3 percent. It is interesting to see how the various members of the energy family fared in arriving at the net increase during this period.

The most rapid increase occurred in the use of natural gas, which more than doubled from 1946 to 1953. The share of natural gas in total energy requirements rose from 13 to 22 percent.

The only decline, on the other hand, was experienced by coal, which showed a drastic drop of almost 19 percent in quantity actually produced. Consequently, it lost its 1946 position as the principal energy source. Its share in total energy requirements fell from 47 to 31 percent.

A considerable gain was achieved by liquid petroleum fuels, which climbed from 36 to 43 percent of total energy requirements. At the latter level petroleum liquids accounted for the largest portion of all energy sources. Within the liquid petroleum category the share of all the components increased. Domestic crude production rose from 31 to 34 percent, natural gas liquids from two to three percent and imports from three to six percent.

Water power has shown only a small increase of eight percent in output. As a result, its relative share of total requirements has about stood still.

The more significant changes are thus the phenomenal increase in the use of natural gas for energy and fuel purposes and the continued decline in the utilization of coal. A great portion of these shifts in market preference can be attributed to technological changes. However, in the case of natural gas, political intervention rather than technological development is reported to result in a competitive price advantage over oil of approximately five to one on a well-head basis. This is an unnatural and uneconomic condition which in the end will benefit no one, including the consuming public. The problem is receiving constructive attention from many competent sources and we can be confident that it will be rectified.

Unsound and unjust marketing conditions caused by unwise political action can and will be remedied to prevent improper market changes, but unless we are going to put a ban on new inventions, new discoveries and new ideas for doing business, which is unthinkable, if not impossible, we shall continue to have important and sometimes devastating changes in our established marketing positions and practices.

Certainly there is no sign of a slackening in new inventions, new discoveries and new ideas in the oil industry. They are all around us, particularly at the refiner-marketer and the petrochemical levels. They are bound to affect future markets in those fields and, directly or indirectly, markets in the producing field. An interesting case in point is the gas turbine for general automotive use, which might become a practical reality before we know it.

If the gas turbine possibility fails to stimulate thinking on the prospects of change in petroleum markets, it might be well to consider the future of the atom and the sun as competitive sources of energy. Here, I am sure, one will find plenty of food for thought. General Electric is advertising that atomic energy will definitely produce electric power for homes in five to 10 years.

All of this is very interesting, but

(Continued on page 126)

A.P.I. Gold Medal to Wallace Pratt

WALLACE E. PRATT, internationally-known geologist, author and philosopher, has been selected as the 1954 recipient of the American Petroleum Institute's "Gold Medal For Distinguished Achievement."

The medal ranks as one of the nation's top industrial citations. It is presented to an outstanding American, not necessarily an oil man, who has made substantial contributions to the arts and sciences of the petroleum industry.

Wallace Pratt, who now resides near Carlsbad, N.M., is a former vice president and director of Standard Oil Company (N.J.). A hand-engraved scroll, which accompanies the medal, will be read at a general session of the annual convention when the presentation is made by P. C. Spencer, chairman of the API board.

Previous recipients of the API Gold Medal include such outstanding men of industry and science as Otto D. Donnell, former president of The Ohio Oil Co.; Lieut. Gen. Ernest O. Thompson, chairman of the Texas Railroad Commission; Walter C. Teagle, former president of Standard Oil Company (N.J.); J. Howard Pew, former president of Sun Oil Co.; Dr. Charles F. Kettering, the internationally-famed scientist and inventor; Dr. William Burton, former vice president of Standard Oil Company (Ind.); and Henry Ford, the motor magnate.

For Mr. Pratt, the API Medal is only one of many high honors that have come his way in recent years.

A past president of the American Association of Petroleum Geologists, he was the first recipient of that group's Sidney Powers Medal in 1945. In 1948, The American Institute of Mining and Metallurgical Engineers awarded him its Anthony F. Lucas Medal for "distinguished achievement in improving the technique and practice of finding and producing petroleum."

A fellow of the Geological Society of America and a member of the Society of Economic Geologists, he is the author of more than 100 papers on geological subjects. He also has published a widely-read book, *"Oil in the Earth,"* which brought to professional men and the general reader alike an easy-to-understand account of oil's formation and its relationship to geology.

Mr. Pratt was born in Phillipsburg, Kans., in 1885, and was graduated from the University of Kansas in 1907. He began his oil career in the Philippines for the government of the islands, and returned to the United States in 1916. He became associated with Humble Oil & Refining Co., first as chief geologist, then in 1924 as director and in 1930 as vice president. In 1937 he was called back to New York as a director of Standard Oil Co. (N.J.) and seven years later was elected a vice president.

Although he retired from active business in 1945 at the age of 60, his activities as a scientist, prospector and author have continued unabated.

Administration will not hamper development of offshore oil properties

By Douglas McKay
Secretary of the Interior

THE PRESERVATION of freedom in the Western world depends to a large measure on a plentiful supply of petroleum, at home and abroad.

With our Allies, we now have available ample supplies of oil due largely to the willingness of the American petroleum industry to take large financial risks in the discovery and development of this vital resource.

There is sufficient credit for all segments of the industry, including domestic operators as well as the American oil companies with facilities over seas.

The question naturally arises "what is the difference between the way our American companies operate and the operations of government-controlled and commercial companies abroad?"

To me, the answer is simple. Here it is the fact that although their risks are great, the return when they are successful is likewise great. It is one of the best examples of our system of free enterprise.

There are many reasons for this. Fundamentally, of course, they are provided with the climate under our system of government to manage their businesses as private citizens.

There are other special reasons.

One of these is a generous tax allowance when they are successful in drilling for oil, to repay them for the dry holes they drill in their continued effort to discover new reserves.

One producing well for every nine drilled is the rule in the U.S. This one producer on the average will yield only enough oil to fuel our needs for a few hours, and a major oil discovery occurs once out of a hundred times the drill bit is put into the ground.

To return to my original theme, I wish to discuss an area of great potentiality.

This is the offshore lands that border our country on the Atlantic, the Pacific and the Gulf.

Experts claim these areas may hold upwards of fifty billion barrels of petroleum. Truly, it is one of the last frontiers that remains to be opened by our oil and gas operators.

Government cannot and will not, under this Administration, attempt to do any part of this job or to hamper production and dictate arbitrarily to the industry in this development. We will insist on full compliance with the statutes and adherence to acceptance of conservation regulations.

In addition to the millions of dollars in cash bonuses offered to us merely for the privilege of looking for this oil, there will be countless additional millions of dollars in royalties and taxes paid into the United States Treasury as time goes on and discovery and production expands.

Most experts agree that the preponderance of offshore reserves may be found in the area under Federal control. Financial benefits will not be confined to a particular state, but will find their way into the national treasury to be shared by all citizens equally, whether they live in Maine, or Texas, or Indiana, or elsewhere.

In the public land states of the Rocky Mountain region, there are additional hundreds of billions of barrels of oil, but it is in a far different form than our reserves of natural crude petroleum. I am referring to valuable shale oil deposits.

It may be some time before it becomes economical to utilize this shale and make liquid products from it. But eventually it will be done by private capital, operating with adequate incentives.

Bureau of Mines experts, working in cooperation with the industry, have made substantial progress in their research in the mining and refining of this great resource. Commercial development, when the proper time comes, can be foreseen.

There is really no secret about what makes the oil business go. As long as we maintain our free enterprise system, and see to it that risks are rewarded, we can be confident of always having the energy we need to meet our requirements.

API school program

WHEN THE Oil Industry Information Committee launched its school program four years ago, caution and care were the principal guideposts. Today, as a direct result, more than 3,000 secondary schools throughout the country are now receiving reliable, up-to-date information about the petroleum industry as part of their regular classroom studies. Educators and oil men alike are enthusiastic about the program, and hopes are bright that it may be expanded slowly but surely to reach every secondary school in the United States.

So far as the Information Committee is concerned, the school program has emerged as the most popular project it has ever sponsored. A recent survey among members of this vast army of volunteers showed unquestionably that the school program is No. 1 in their estimation and that they are promoting it with all of the enthusiasm at their command.

Probably the key factor in winning such universal support from oil men and educators was the care with which the school program was inaugurated. Before it was pronounced ready for nationwide acceptance it was subjected to every possible test and the materials themselves were viewed and reviewed by scores of teachers and high-ranking educators.

But to start from the beginning, the school program had its genesis in a survey made by the Oil Industry Information Committee in 1950. This survey confirmed the committee's worst fears, that many schools not only were using outdated textbooks, but in an alarming number of cases failed to give students any kind of a picture of the unprecedented industrial surge of the postwar years. There simply was a dearth of accurate and up-to-date information on the petroleum industry and its operations in the scholastic world.

The program designed by the Information Committee was expected to accomplish four basic things: (1) meet the OIIC objective, which is to make clear how well the people of the United States are served by America's oil businesses and to gain support for conditions under which these businesses may continue to be privately managed, fully competitive and financially sound; (2) prepare texts for students that would be both interesting and informative; (3) win the approval of school authorities for the project; and (4) interest more oil men in the operation of their local school system and bring them into closer contact with school teachers and officials.

With these laudable objectives in mind, the OIIC turned to the educators themselves for help. Before a word of the textbooks was written their advice and understanding were solicited. The conferences resulted in the writing of six booklets; one each on general science, chemistry, physics, conservation, social studies and economics. Supplemental materials were prepared for teacher use. These included wall charts, film strips, handbooks, and work supplements. All of the booklets are supplied free to students and teachers, with the hope that the students not only will peruse them, but will show them to their parents in their home.

The booklets were approved by more than a score of educators, including such prominent leaders as Dr. William Jansen, superintendent of the New York City school system and Dr. Kenneth Oberholtzer, head of the Denver, Colorado, school system. Their endorsements are contained in a booklet entitled "Teaching Aid Materials," which summarizes the entire school program.

At the beginning, tests were limited and closely controlled. Less than 100 schools received the material in the first two years. By 1953 the pace was stepped up to reach 1,000 schools. The response was so gratifying that, at a national OIIC meeting in Cleveland late in 1953, it was decided to extend the program throughout the country. More than 3,000 schools are in the program now and a slow, steady growth is anticipated.

The slowness of the rate of growth is deliberate. The program has never been offered to schools from a central office on a mass basis. In keeping with the fourth point of the original plan, it has to be introduced through local oil men who are residents of the towns or counties in which the schools are located. Not only does this tactic encourage oil men to discuss their industry with teachers and students, but it insures that each school contacted will be properly serviced. This thinking is carried to the point that the program is not advertised in teacher publications. Such advertising, it is feared, might precipitate an overwhelming demand for the materials, and conceivably could destroy the personal contact approach, which the OIIC feels is essential to the program's success.

Even after the program has been introduced in a school, this attitude of personal contact prevails. Every district OIIC office maintains a record card on each school using the materials. The card contains such pertinent information as the name and location of the school, principal, enrollment, quantity of materials sent to it in the past, and the name of the oil man who is serving as the principal contact. Thus, by keeping tabs on the cards, the OIIC makes sure that the program runs smoothly and that additional materials are available when required.

These personal contacts with educators are followed through carefully. In 1954, for example, a national conference of educators was held in the midwest to review the program and discuss further expansion. Similarly, many smaller get-togethers were arranged. One outstanding event was a luncheon in the New York-New Jersey district, which brought out 350 oil men, science teachers and department heads of Greater New York schools. Superintendent Jansen praised the OIIC program, and this led to its introduction in almost 200 schools in New York alone. These meetings will be continued next year. Eight regional affairs are on schedule already.

In addition, oil men are making motion pictures and speakers available for school assemblies. The "Magic Barrel" demonstration, which highlights some of the many wonderful products flowing from petrochemicals, is scheduled to have more than 200 showings in New York schools alone. In fact, when this "Magic Barrel" was shown to New York teachers, the demand was so heavy that it was booked solidly for months. In Cincinnati, 150 schools have requested the "Magic Barrel."

In spite of such achievements, the Oil Industry Information Committee knows that the school program can be improved. Booklets and other materials are being reviewed and rewritten constantly, based on attitudes of students and teachers. New materials are being prepared for inclusion in the program where warranted.

The OIIC also is planning a depth of penetration study, to see how far the materials are going. When that is completed steps will be taken to incorporate this new information into the program.

At the present time, the four-year-old program is healthy and growing and is accomplishing a tremendous objective; it is telling students about the wonders of the oil industry at a time when they are most receptive to learn about it.

Air view of the clover-leaf intersection of Highways N. J. and N. J. 17 west of the George Washington Bridge spanning the Hudson River between New York and New Jersey. Photo courtesy Standard Oil Co. (N.J.).

Petroleum's stake in the national highway situation

"MORE MONEY FOR ROADS!" is the cry today.

Supposedly the voice is that of the motorist or other highway user who depends upon highways for transportation, commerce or even pleasure and who, in the final analysis, must pay the bill for these road improvements in special taxes.

More often than not, the agitation stems from government officials, road building interests and even competing modes of transportation, from all those who, for one reason or another, want to see more tax revenue extracted from the highway-using public.

It seems paradoxical that in this year 1954, with highway tax revenues at an alltime peak, with the postwar road building boom going at full stride and with construction costs at last beginning to take a drop from the inflated level of a few years ago, the cry for more and more road dollars today rises higher and louder than ever.

As 1955 approaches, a year in which no less than 44 state legislatures will meet in regular sessions, we can expect to hear more and more talk of increasing highway tax rates, especially the gasoline tax, the eternal fountain to which legislators inevitably turn in the search for additional highway dollars.

The situation makes this an especially appropriate time to take stock, to appraise the highway situation with a realistic eye and to scrutinize closely the financial side of the picture.

Last year the so-called highway use taxes collected by the several states reached a record sum of $3.4 billion, and this year's total can be expected to go even higher.

The 1953 figure included nearly $2.2 billion collected in state gasoline taxes and more than $1.2 billion in fees and taxes levied upon motor vehicles and motor carriers. It was more than double the yield of such taxes just seven years before, in 1946, and triple the figure of 1936.

The highway use taxes collected by the states during the past six years have amounted to over $17½ billion. And how much is $17½ billion? It is over a billion dollars more than the total amount paid in such taxes during the 30 years prior to Pearl Harbor, the period which witnessed in America the beginning and full development of what is known to be the greatest nationwide system of highways in the world.

Last year the average American motor vehicle owner paid $98.76 in special state, federal and local automotive taxes, a total of nearly $5½ billion, of which more than $3 billion was paid in the form of state, federal and in a few cases local taxes on gasoline.

The $5½ billion total does not take into consideration such items as turnpike tolls, nor does it include property taxes on vehicles and general sales taxes on cars and automotive supplies. All these are multi-million dollar items in many states and if figured as part of the motorist's tax burden would raise the average tax per vehicle to about $150 a year.

In effect, the gasoline tax itself is a "sales tax," and one of fantastically high rate, a fact which is often overlooked by the vehicle-using public. There are two factors which have caused the gasoline tax to be well concealed and its full impact lost upon the highway-using public.

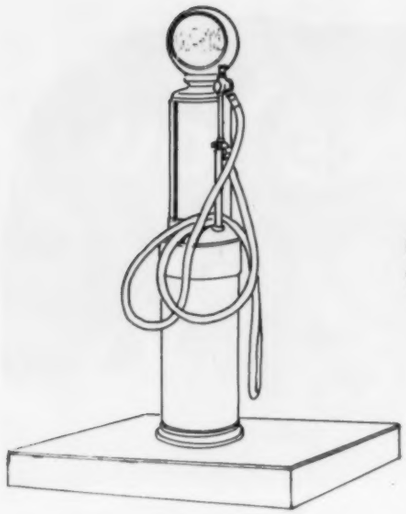
When a person goes into a store to buy some item of merchandise subject to a general sales tax or to a federal luxury tax, the price without tax is the price usually quoted. The tax is later computed separately as an additional item on the sales slip and the buyer thus goes away fully aware of what taxation has cost him.

Not so with gasoline. The automatic price meters on service station pumps show the price combined with taxes. The result is that few motorists today have any close realization of what these gasoline taxes add to the cost of the product.

The other concealment lies in the confusion over the words cent and percent, terms which have a similar sound, but a vastly different meaning. The taxes on motor fuel are thought of a "penny taxes," but how those pennies add up! The 7½ cents per gallon which Americans now pay on the average (an average state rate of 5½ cents plus the 2-cent federal tax) is actually 35 percent of the average retail price of regular gasoline.

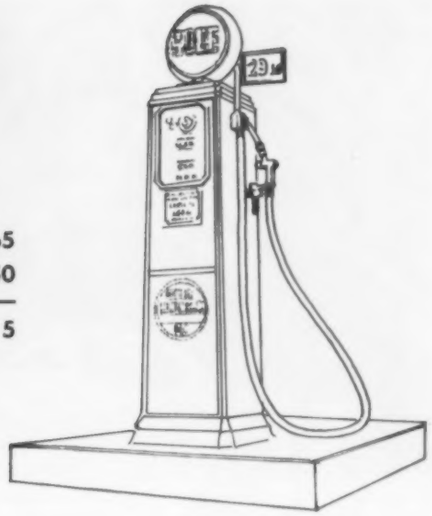
Certainly no other non-luxury item in America bears a tax rate of 35 percent of retail price. In some states these taxes on gasoline range even as high as 45 percent. Sales taxes generally carry rates no higher than one, two, or three percent, and even those, in some states, can be numbered among the most controversial political issues of the day.

Federal excise taxes on such items as furs, jewelry and perfumes, never higher than 20 percent, were reduced this year to 10 percent by public demand. Congress also cut to 10 percent the 15 percent tax on rail, steamship and air travel, but without giving more than a passing thought to reducing the federal



GASOLINE PRICES
(in cents)

1920-1930		1954	
Gasoline	21.64	Gasoline	21.65
Tax	1.70	Tax	7.50
Total	23.34	Total	29.15



tax on gasoline for the family car. Gasoline taxes are seldom reduced. They constantly go higher and higher.

To see just how much taxes have added to the consumer cost of gasoline, it is interesting to compare the price-tax relationship of today with the figure of 25 or more years ago.

The average service station price of regular gasoline throughout the United States for the first nine months of this year was 21.65 cents a gallon. That is virtually the same as the 21.64 cent average price of the 20's, an increase of only 1/100 of a cent.

It is doubtful that any other major product or commodity in America can be shown to have undergone so slight a net increase in price over that period of years. Wholesale commodity price indexes for June of this year showed a general rise of 72.3 percent over the 1926 level, with farm products up 64.9 percent; food up 73.9 percent; home furnishings up 76.1 percent; and metal and metal products up 98.1 percent.

But let us look now at the taxes on gasoline. As indicated, the average gasoline tax today, including the 2-cent federal tax, is 7.5 cents per gallon, or 35 percent of the retail price. The average tax rate during the 10-year period of the 20's was 1.7 cents per gallon, or less than eight percent of the price.

In short, the retail price of gasoline today is practically the same as it was during the 20's, but the taxes on gasoline are more than four times as high.

Many of the gas tax increases were enacted during the late 20's and early 30's, but a new rash of such increases has broken out during the nine years since the close of World War II.

A half-cent increase in the federal tax rate in 1951 plus 50 separate increases enacted by 39 states and the District of Columbia since 1945 have combined to boost the average rate nationally from 5.9 cents a gallon to the present average of 7.5 cents, a 27 percent increase in average tax rate in nine years.

At this point, it may be well to review briefly the basic philosophy of gasoline taxation in the states. Obviously, gasoline is not a super-luxury item which one would normally expect to see taxed three or four times as heavily as a diamond bracelet or a mink coat.

The only possible justification for a 35 percent tax on gasoline is that this is a special tax upon a special class of citizens for a special purpose.

The $3.4 billion which vehicle owners pay to the states in a year in gasoline and motor vehicle taxes is a super-imposed tax burden which highway users alone are called upon to pay, in addition to their normal share of general taxes.

With the coming of the automobile, there arose a sudden desperate need for roads and highways throughout the United States. All states were soon faced with the problem of how to provide and pay for better roads, and motor license fees were first devised as the means of assessing the cost of roads upon the people who would use them.

A few years later, as this source of revenue failed to meet the full need, gasoline taxes were added as a gallon-by-gallon toll the motorist should pay while using his highways. With that background in mind, it is easy to understand why these state laws originally, and almost without exception, contained the provision that the revenue was to be used only for highway purposes.

As time went on the temptation arose for many state officials to find other uses for these highway funds and it became common for huge sums of road tax money to be diverted to general state expenditures. At times the diversion figure nationally ran to more than 15 percent of total highway revenues. This wasn't taking place in just a few states; in varying degree, it happened in every state in the nation except Nevada and Wyoming.

Happily, by 1952 the diversion figure nationally had dropped to 6.5 percent, with only 16 states still counted as serious offenders. Oil men in the various states can take a large measure of credit for having brought about this change by pointing up the basic injustice which diversion imposed upon highway users.

Forty-four of the states now maintain separate funds for their highway tax revenues. Twenty-four of them have gone a step further by adopting constitutional amendments specifically outlawing the diversion of highway funds; other states are showing signs of doing likewise.

While it is true that road fund diversion has declined on a national percentage basis, the condition still remains a serious roadblock to highway progress in the few states still guilty of the practice. Also, as might be expected, the worst offenders can be numbered among the states often cited today as having serious traffic congestion problems.

The state of New York over a period of years has diverted nearly a full billion dollars of the revenue collected from highway users to non-highway spending,

(Continued on page 102)

Poster bearing the 1954 theme of Oil Progress Week.

Oil progress week gains nationwide observance

NORTH, EAST, SOUTH AND WEST, the United States oil industry turned itself inside-out last month in what was probably the most extensive, and most effective, Oil Progress Week ever staged.

This was the seventh time that this annual observance had come to pass, and the enthusiasm and know-how that has been a-building through the years paid off in an impressive series of special events all over the country.

Two key factors helped put this year's "Week" over the top in spectacular fashion.

The first of these was the "Loaned Executive" plan which the Oil Industry Information Committee of the American Petroleum Institute, which sponsors the affair on behalf of the industry, originated on a trial basis in 1953.

This plan provided for the temporary loan of oil industry executives, for periods of several days to a week or more, wherever they could be spared, to stir up local committees and promote activities generally. As October 10 approached, more than 200 of these executives swung into action in 22 states—and stir up activities they did. In a series of rapid-fire meetings, in which their specialized talents for organization, creation and direction were used to the fullest, they whipped up so much enthusiasm that it will take months to add up the box score of results.

The second key factor was the exceptionally high number of dealers who participated this year. At least 10,000 took part in the "Lucky Folder" program in 24 cities. This program originated in Houston, last year, and for a while was known as the "Houston Plan." Under it, dealers passed out folders at their service stations, each of which contained either a number or a place for the recipient to register his name. The folders also carried information about the oil industry and the role of oil men in serving the public as well as the role of competition in keeping the industry on its toes. At week's end, drawings were held to determine the winners of the long list of prizes ranging from television sets to all-expense paid trips to Bermuda, the Bahamas, Cuba, New York and Miami.

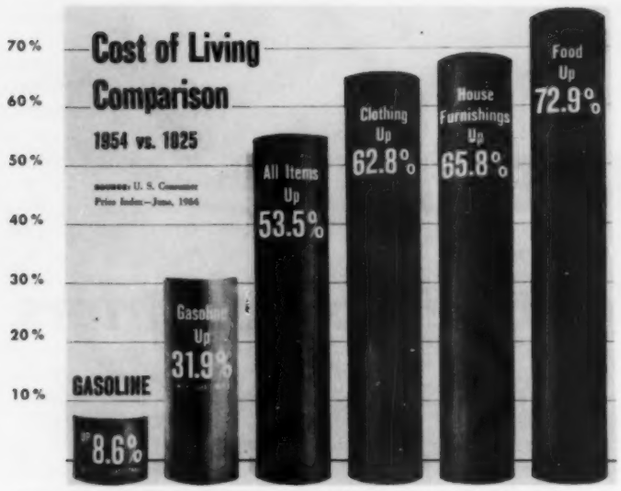
Conservative estimates indicated that the dealers passed out more than 2¼ million folders during Oil Progress Week. Biggest city to participate in this special event was metropolitan New York. Others included Erie, Pa.; Atlanta, Ga.; Charlotte, N.C.; Jacksonville and Miami, Fla.; Chattanooga and Knoxville, Tenn.; Evansville, Ind.; Kansas City, Mo.; Minneapolis-St. Paul, Minn.; Fargo, N.D.; Moorhead, Minn.; Duluth, Minn.; Superior, Wis.; Mobile, Ala.; El Dorado, Ark.; Dallas, Fort Worth, Wichita Falls, Houston, San Antonio and Baytown, Tex.; Tulsa and Oklahoma City, Okla. and Denver, Colo.

This year's motion picture, "The Story of Colonel Drake," probably had more viewers than any other motion picture in a one-week period. Released for public showing at the beginning of Oil Progress Week, it was shown over and over again at innumerable meetings, luncheons, dinners, open houses, in schools and, of course, on television. In some sections of the country, every television station in the area showed the Drake movie at least once during Oil Progress Week.

"The Story of Colonel Drake" is the 1954 sequel to other API films, such as "American Frontier," "Crossroads, U.S.A." and "Man on the Land," all of which won citations and awards in the past. Starring noted actor Vincent Price in the lead role, the 1954 film faithfully and dramatically recreated the historic events which led up to the drilling of the world's first commercial oil well near Titusville, Pa., in 1859. In Technicolor, the motion picture won wide applause everywhere it was shown. Over the next several years, the number of persons who will see this film will run into the millions.

During Oil Progress Week itself, there were speeches by the hundreds before luncheon and dinner meetings, civic groups, social and fraternal clubs, women's groups, school assemblies and so on. Top-echelon executives of the industry led the parade of speech-makers which included such other top-flight non-industry persons as Secretary of the Interior Douglas McKay; Assistant Secretary of the Interior Felix Wormser; Dr. Arthur S. Flemming, director of the Office of Defense Mobilization; Lieut. Gen. Ernest O. Thompson, chairman of the Railroad Commission of Texas; Fred Gurley, president of the Santa Fe Railroad; Lieut. Governor E. T. Anderson of Washington, and many others.

Industry leaders who made hard-hitting speeches in many sections of the country included P. C. Spencer, president of Sinclair Oil Corp. and chairman of the board of the American Petroleum Institute; Frank M. Porter, president of the Institute; Rawleigh Warner, chairman of the board of The Pure Oil Co.; B. Brewster Jennings, president of Socony-Vacuum Oil Co.; H. S. M. Burns, president of Shell Oil Co.; Howard G. Vesper, president of California Research Corp.; John Harper, president of Harper Oil Co.; W. K. Whiteford, president of Gulf Oil Corp.; T. S. Petersen, president of Standard Oil Company of California; D. T. Staples, president of Tide Water



Even after adding in an increase of 250 percent in taxes, gasoline selling prices have risen less than other commodities.

Governor Johnston Murray of Oklahoma signs a proclamation for Oil Progress Week, October 9-16, using the hood of a car for his desk, in front of an Oklahoma City service station. Giving free service to his automobile are three service station dealers, while Fred Fellingham, Stanolind Oil and Gas Co., district vice chairman of the Oil Industry Information Committee in charge of Oil Progress Week in Kansas and Oklahoma, looks on.

Associated Oil Co.; R. L. Minckler, president of General Petroleum Corp.; R. L. Milligan, president of Pure Oil Co.; Willard Wright, general sales manager of Sun Oil Co.; Samuel B. Pettengill, of Pure Oil Co.; W. J. Arnold, executive vice president of Pure Oil Co.; A. C. Sailstad, general sales manager of Standard Oil Company (Ind.); John Boatwright, marketing economist for Standard Oil Company (Ind.); S. F. Bowlby, vice president of Shell Oil Co.; George O'Brien, vice president of Standard Oil Company of California; Thomas L. Wark, vice president of Tide Water Associated Oil Co.; T. S. Moroney, secretary of Honolulu Oil Co.; Joseph Jensen, assistant to the president, Tide Water Associated Oil Co.; Ernie Pyles, vice president of Monterey Oil Co.; and many many others.

In local communities, oil men, civic officials and others, by the hundreds, talked about the oil industry. Rotary, Kiwanis, Lions, and other such clubs, chambers of commerce, school assemblies and women's groups all received 'tastes of oil' during the week through speeches, displays and exhibits, motion pictures and similar events.

There were so many demonstrations of the "Magic Barrel" and the "Magic Suitcase" that it will take weeks to count them all up. The "Magic Barrel" is a fascinating lecture-demonstration on the wonders of petrochemistry. From the "Magic Barrel," as the demonstrator talks, flows a vast array of consumer items made directly or indirectly from petroleum.

Many governors and hundreds of mayors and borough officials signed proclamations formally calling public attention to Oil Progress Week. The proclamations point out that "healthy competition in business and commerce is the hallmark of 'The American Way of Life,'" and urged the citizens of the respective communities to give some thought to "the many services and contributions made to the betterment of our public, social, business and private lives, as well as to the security of our beloved country, by the oil men who live and work in our midst."

Central theme of this year's OPW observance was "Oil Serves You," while special emphasis was placed on the role of oil industry competition and how it serves the American people. The "Oil Serves You" symbol was featured on billboards, windowposters, bumper strips, banners, A-Boards and in many advertisements.

Much prominence also was given to a special poster based on an advertisement published by the Institute earlier this year. This was the so-called "Moscow Service Station" ad, which featured two pictures of gasoline stations in the Russian capital. Huge blow-ups of one of these pictures were displayed by many service stations, and the contrast between Soviet and U. S. stations had a telling impact.

Pamphlets, leaflets and souvenirs were passed out by the thousands by oil men and oil companies. The principal souvenir booklet this year was a companion piece to the Drake motion picture. With the same title, "The Story of Colonel Drake," the booklet used bright colors and line drawings to tell the story of the discovery of oil near Titusville, Pa., in 1859. It proved to be a popular piece, particularly with schools and youngsters.

Supporting Oil Progress Week events was a two-fisted advertisement which saw the Institute fight back against critics of gasoline prices. The advertisement hammered home the message that "gasoline is the biggest bargain on the American family's shopping list," because it has not increased in price nearly as much as other commodities. The advertisement featured a cost of living comparison, 1925 versus 1954. Gasoline prices, excluding federal, state and other taxes (which have increased over 250 percent since 1925), have risen only 8.6 percent, while clothing went up 62.8 percent, house furnishings 65.8 percent and food 72.9 percent. The average for all items is 53.5 percent, emphasizing how small has been the rise in gasoline prices.

There were many fairs and expositions, particularly in the southeast, during Oil Progress Week. Attendance at these ranged as high as 100,000 persons, and local Oil Industry Information Committees made sure that petroleum exhibits, displays, motion pictures and information had prominent places. Down in the southwest, the Permian Basin Oil Show had a fascinating array of relics and machinery from the early days of oil. Thousands of spectators visited this show during its four-day run.

In effect, it was like that all over the country. Everywhere possible, the men and women of oil made special efforts to bring their industry to the attention of the public. There were, in fact, so many parades, speeches, radio-television shows and other special events that it is doubtful whether an accurate count will ever be made. Perhaps the best way to sum it up would be to say that probably never before has so much been said and done about one industry in so short a period, and probably never before have so many people been informed in so many ways about petroleum and its contributions to the American Way of Life.

IRANIAN OIL AGREEMENT

covers terms and obligations of partners

SIGNING OF THE AGREEMENT between the government of Iran and the National Iran Oil Company on the one part and the members of the Consortium of oil companies on the other on August 5, subject to ratification by the Majlis and Senate of Iran and the assent of H.I.M. the Shah, brings to an end the imbroglio which arose in 1951 following the attempted nationalization of the Iranian oil industry.

According to the agreement, Consortium members will produce, transport, process and market oil from the areas included in the concession held by Anglo-Iranian Oil Company Ltd. with the exception of the Kermanshah refinery and the Naft-i-Shah oilfield, and there shall be an equal sharing between the two parties of the income derived from these operations.

The Consortium consists of eight international companies, five American and three European, with participation as follows:

Gulf Oil Corporation Socony-Vacuum Oil Co. Inc. Standard Oil Co. (N.J.) Standard Oil Co., Calif. The Texas Company	8% each, total 40%
Anglo-Iranian Oil Co. Ltd.	40%
N. V. de Bataafsche Petroleum Maatschappij	14%
Compagnie Francaise des Petroles	6%
	100%

To implement the agreement, the Consortium has caused two operating companies to be incorporated under the laws of the Netherlands, which, under Iranian law, have also been registered in Iran. They are Israanse Aardolie Exploratie en Productie Maatschappij N.V. (Iranian Oil Exploration and Producing Company) and Iraanse Aardolie Raffinage Maatschappij N.V. (Iranian Oil Refining Company).

The board of directors of each company will consist of seven members with two of each board to be persons nominated by National Iranian Oil Co. (NIOC)

These operating companies shall carry out their respective functions, under specified terms, on account of NIOC to whom all products from these operations shall be delivered.

The Consortium companies shall purchase crude oil, natural gas and refined products not required for consumption in Iran from NIOC and shall resell in Iran for export from Iran.

To implement this procedure they may individually assign part or all of their rights pertaining to purchases and resales to a trading company, which shall be registered in Iran.

NIOC will sell to these trading companies the oil produced in the proportion in which the parent companies participate, with the exception that NIOC has the right, should it wish, to take crude oil, at the posted price, in lieu of a part or all of the cash payment of 12½ percent of the posted price of all oil produced.

The Consortium members guarantee that, if the ratification of the agreement takes place on or before October 1, 1954, the aggregate of crude oil produced will not be less than the following quantities:

YEAR	CUB. METERS	APPROX. LONG TONS
1955	17,500,000	15,000,000
1956	27,500,000	23,000,000
1957	35,000,000	25,000,000

Later production will be regulated according to supply and demand of Middle East crude oil.

Under the same conditions of time, the Consortium members will strive, without guarantee, to implement the following refinery program:

YEAR	CUB. METERS	APPROX. LONG TONS
1955	7,500,000	6,500,000
1956	12,000,000	10,500,000
1957	15,000,000	13,000,000

From the above figures it is evident that it is not intended to restore the Abadan refinery to the same throughput at which it was running when operations ceased in 1951. This may result partly from the obsolescence of certain units and partly from the fact that refinery capacity in the Middle and Far East has been increased greatly in the past three years.

On the quantities of oil handled by the two operating companies, they shall be entitled to fees, which in case of the exploration and producing company shall be one shilling per cubic meter of all oil delivered and in the case of the refining company one shilling per cubic meter of crude oil refined.

This one shilling per cubic meter is equivalent to about 14 pence, or U. S. cents, per long ton and is in addition to all production and refining costs and charges.

During each of the first 10 years of the agreement the exploration and producing company shall include in its working costs of operation a sum of £2,600,000 ($7,280,000) and in the case of the refining company a sum of £4,100,000 ($11,480,000) as fixed asset charges on installations in Iran which were originally provided by the Anglo-Iranian Oil Co. Ltd. The proceeds of these fixed asset charges may be disposed of by the operating companies as they see fit.

As the Anglo-Iranian Oil Co. will receive payment from the other members of the Consortium with respect to their 60 percent interest, it is possible that the major portion of these fixed asset charges may be allotted to it.

No definite statement has been made as yet regarding this, but the AIOC has issued a notification that after ratification of the agreement a full statement regarding payments to it from the other members of the Consortium will be issued to its shareholders.

Each trading company shall pay NIOC a stated payment at the rate of 12½ percent of the applicable posted price for all crude oil purchased and sold in Iran by that company, and for all crude oil purchased and delivered to the refinery at Abadan for its account, and for any oil up to 12½ percent of the programmed production which NIOC may elect to take in kind.

This payment ensures Iran a definite income from the oil produced, should production and refining costs be greater than posted prices and infers that the

Consortium companies shall be responsible for any losses due to their operations. According to Article 35 of the amended Iranian income tax of 1949, there shall be deducted from the amount of tax to be paid on the net income, an amount equal to any stated payment or any other payment of a similar nature paid to the government, NIOC or any other agency of the government.

It is also understood that the maximum amount paid to Iran under this agreement in taxation is 50 percent of the net profit from the operations. This amount is not specifically mentioned in the agreement as it is covered by the amended income tax law.

Capital to meet approved capital expenditure by the operating companies shall be provided in equal parts by NIOC and the relevant operating company. The part provided by the operating company shall constitute a debt due from NIOC which shall be payable in equal annual installments over a period of ten years.

The relevant operating company shall loan free of interest the sums required by NIOC during the first two years after the effective date, for the purpose of providing NIOC's share of approved capital expenditure, this loan to be repaid in ten equal annual installments.

The operating companies shall finance, free of interest, the cost of erection or installation of any new, additional or substitute assets they may require in their operations. This shall be repayable in equal annual installments over the ten-year period following the commencement of use of the asset.

In consideration of this payment, Iran and NIOC shall allow the operating companies free use of these new assets for as long as may be required and shall be entitled to include the sums expended in their operating costs.

Funds required by the operating companies for the above purposes shall be advanced to them, free of interest, from time to time as required by the trading companies, in the proportions agreed between themselves.

Inclusion of such clauses is rendered necessary by the present financial position of Iran and NIOC, as they would not be able otherwise to rehabilite or improve the properties.

NIOC will provide, maintain and administer ancillary services as required by the operating companies and denominated non-basic services which include: housing estates; maintenance of public roads; medical and health services; operation of food supply systems, canteens, restaurants and clothing stores; industrial and technical training and education; guarding of property; welfare facilities; public transport; communal water and electricity supply and other services as may be agreed upon.

In the first instance, NIOC will bear the operating costs of non-basic operations, but the relevant operating company will refund such costs and will include them in its operating costs.

The operating companies shall have the right within the area specified in Schedule I of the agreement to exclusive use without charge of all lands of NIOC which are at present occupied or used by the various departments of the oil industry covered by this agreement, plus any lands in Iran not already in use which may be required in connection with their operations.

Lands already in use shall, when reasonably required by the operating company, be rented or purchased by NIOC for the use of the relevant operating company. The rent or purchase price shall be reasonable and not in excess of the market price.

If the lands are leased or purchased in consideration of a lump sum, payment for same shall be made by the operating company and shall constitute a debt due from NIOC repayable in equal installments over 20 years.

Articles also deal in a similar manner with water and building materials rights.

Among the obligations of the operating companies apart from those of carrying out their particular activities according to good industry practice and sound engineering principles as well as keeping full technical records and financial accounts are those of ensuring the employment of Iranians of the requisite qualifications and experience as far as is practicable, and of co-operating with NIOC in the industrial and technical training and education of Iranians to replace foreign personnel and affording them opportunity for occupying responsible positions in the operations of the companies.

All machinery and equipment required by the operating companies for the efficient and economical working of their functions may be imported without license and exempt from customs duties, charges and other taxes and payments.

Articles considered appropriate for the use of the personnel of the companies shall be imported without necessity of license, but shall be sold only to the personnel.

Many of the articles in the agreement are conventional clauses dealing with accounting methods and settlement of disputes by arbitration and the appointment of arbitrators.

The account of operating and trading companies are to be kept in sterling and records kept in Iranian currency for transactions made in such currency.

All payments due NIOC and all payments due to Iran shall be made in sterling, but if sterling shall not be freely convertible, or if the British government shall discontinue the arrangements negotiated concurrently with this agreement relative to the convertibility of sterling into United States dollars, this matter shall be subject to review.

The Consortium members, the trading companies and the affiliates of any of them shall be able to buy Iranian currency with sterling at the commercial bank rate of exchange and without discrimination.

This enables any of the operating or trading companies to pay for their necessary working disbursements, including wages and salaries in Iran, in the currency of the country.

The term of the agreement shall be 25 years from the effective date and may be extended for three further periods of five years under the terms of the present agreement at the wish of the Consortium members and the operating companies.

Although the two operating companies have been incorporated under the laws of the Netherlands and duly registered in Iran, the names of the seven directors who constitute their respective boards have not been published at time of writing and probably will not be published until the agreement has been ratified by the Majlis.

An organization called Iranian Oil Participants Ltd. has been formed to act as an executive for drafting the basic policy of the Consortium.

On September 21 a survey party left London for Iran by invitation of the Iranian government to determine the requirements for re-starting operations in the fields and refinery.

The party was led by J. E. L. Broueer, head of the geological department of the Royal Dutch/Shell group, and consisted of five experts of the Royal Dutch/Shell group; four representatives of Anglo-Iranian; two representatives of Standard Oil Co. (N.J.) and one representative of the Iraq Petroleum Co. Ltd.

The party will report its findings to the Consortium after the agreement has been ratified by the Majlis.

Part II of the agreement deals with compensation to the Anglo-Iranian Oil Co. In it the amount of £51 million ($142,800,000) which would have accrued to Iran under the supplemental agreement of 1949 if it had come into force will be set off against the amount payable by Iran to the AIOC and in addition a sum of £25 million ($70,000,000) free of interest is due and payable by Iran to AIOC.

This is to be paid in ten annual installments of £2,500,000 ($7,000,000) the first being due and payable in London on January 1, 1957.

At the request of Iran, this sum shall be paid to AIOC by trading company nominated by AIOC and shall be treated as a payment of Iranian income tax by that company.

Iran and AIOC and Anglo-Iranian Oil Co. Ltd. therefore mutually release each other from all claims and demands in respect to any matter prior to the effective date of ratification of the agreement.

LOUISIANA offshore operations

By James W. Calvert

WHILE THE U. S. Department of the Interior and the State of Louisiana seek to work out an amicable settlement of their dispute over ownership of the Louisiana tidelands, some 20 major oil companies and independents are planning to speed the development of an offshore area which may well hold a potential reserve of 12 billion barrels of oil and 70 trillion cubic feet of gas.

Already they have spent close to half a billion dollars to prove a theory long held by geologists: that beneath the waters of the Gulf of Mexico are many salt domes and related structures capable of producing enormous quantities of liquid and gaseous hydrocarbons. They have patiently battled such obstacles as weather and sea, rising operating costs and years of governmental bickering over title to these rich lands under the ocean.

The coastal front of Louisiana, in a strip approximately 125 miles wide, is estimated to contain one fourth of the nation's oil reserves and one half of its natural gas. While it is impossible to estimate the offshore potential, many geologists believe that an offshore belt of the same width should be as productive as the coastal belt that parallels it, and would yield about 200,000 barrels per day.

Off the Louisiana coast the continental shelf slopes gradually seaward at the rate of six feet per mile to the 100 fathom curve, where it abruptly ends and steps off into an underwater abyss thousands of feet deep. This "shelf" is 140 miles in width at its widest part.

Just how far out onto the continental shelf oil men will be willing or able to go in their search for new production is a matter that only time and experience can tell. At the present time, it does not appear practicable to operate any farther than 50 miles at sea, where waters range from 60 to 100 feet in depth.

However, Dean A. McGee, Oklahoma City, president of Kerr-McGee Oil Industries, Inc. and a pioneer in offshore drilling, feels there is no limit to where offshore drilling might go.

"Five years ago we were talking about the days when we would drill in 60 to 75 feet of water," he said. "Today we are talking about 100 to 125 feet. A year from now we may be talking about something else."

Kerr-McGee launched this new petroleum science when it began drilling a wildcat well at sea 12 miles from the nearest land, at Ship Shoal lighthouse off the coast of Terrebonne Parish, Louisiana.

The year was 1947.

The well was completed on November 11 of that year with a potential production of 600 barrels per day.

Kerr-McGee is generally credited with bringing in the first offshore well. Actually the honors should go to The Pure Oil Co. as the first to successfully operate at sea in the Gulf of Mexico. Pure brought in the discovery of the Creole field, one mile off the coast of Cameron, Louisiana, in January of 1938. The field is still producing. There were limited operations in the Gulf until the beginning of World War II, but shortages of manpower and of materials brought an end to development.

Following the war, several companies began exploration work in the areas close inshore, but Kerr-McGee was the first to go out of sight of land with its State Lease 754 No. A-1 and prompted the majors to look seaward in their quest for oil.

Several hundred wells have been drilled in the offshore areas of Louisiana since the completion of the Kerr-McGee discovery well, and 35 oil and gas fields have been discovered. At the present time they are producing at the rate of about 47,000 barrels per day, which is about 7.5 percent of Louisiana's total daily production.

Cumulatively, these fields had produced 36,493,000 barrels of oil since the Kerr-McGee discovery. The rate at which offshore fields are being developed is indicated in the annual production figures since 1947:

	BARRELS
1947	3,217
1948	132,299
1949	1,064,265
1950	4,363,141
1951	6,560,899
1952	6,896,250
1953	10,042,540
1954 (first half)	7,430,561

In the period from 1938 through 1953, a total of 234 wells was drilled off the coast of Louisiana, of which 127 were oil producers, 33 were gas and gas condensate producers and 74 were dry holes. In the first six months of 1954 there were 94 wells drilled, of which 76 were oil producers, two were gas producers and 16 were dry holes.

Another indication of the rate of development in offshore Lousiana can be seen in the drilling permits issued by the Louisiana State Department of Conservation. During July of 1954 the state issued 297 drilling permits, of which 21 were for offshore wells, as compared with the same period of 1953 during which seven of the 253 permits issued were for offshore drilling operations. In January of this year there were nine offshore permits issued out of a total of 229, as compared with January of 1953 when four of the 221 drilling permits were for offshore wells.

On September 1 of this year, the U.S. Coast Guard, charged with the responsibility of keeping shipping lanes clear or at least well marked for the safety of marine navigation, listed 125 rigs or other oil field structures within the area designated as inland waters, and 25 platforms in navigable waters where international rules-of-the-road apply.

Because of the high cost of offshore drilling operations, it was clearly recognized very early that the development of producing fields in these areas must be very different from the development of oil fields on shore. Thus the Louisiana Department of Conservation on September 24, 1948, issued an order setting up a depth bracket allowable schedule considerably higher than that of inland areas. This order provided that "the producing characteristics of offshore wells should be reviewed to determine whether or not the proposed schedule of allowables is greater than the amount which can be produced efficiently and economically without waste."

As a result of this order, the Louisiana offshore wells are allowed to produce an average of over 200 barrels per day, which is several times the average daily production of oil wells in the United States.

Offshore operations developed with increasing tempo until June of 1950 when the Supreme Court handed down its "paramount rights" decision, invalidating state claims of ownership. This sharply curtailed drilling in the coastal waters except for those areas in the inlets and bays which undisputedly belong to the State of Louisiana. Beyond those limits, drilling was confirmed to field operations for conservation purposes. However, with the completion in 1951 of all exploratory drilling underway at the time of the Supreme Court decision, the waters of the Gulf of Mexico off the Louisiana coast lapped around the structures in 27 fields.

The principal Louisiana offshore oil producing fields with current and cumulative production are shown in an accompanying table.

Since May of 1953, when the signing of the Tidelands Act by President Eisenhower brought about the resumption of drilling in offshore areas of Louisiana, eight fields have been discovered as follows:

Chandeleur Sound Block 1 (Phillips); Chandeleur Sound Block 69 (Texas); Main Pass Block 23 (California); Main Pass Block 24 (California); West Delta Block 53 (Continental); Eugene Island Block 18 (Shell); West Cameron Block 192 (Continental); and West Cameron Block 110 (Magnolia).

About 300,000 acres of underwater lands are now under lease out of 4½ million acres claimed by the state of Louisiana. Since 1947 Louisiana has realized some $65 million from its offshore leases, of which $26 million was paid in bonuses and $24 million in rentals prior to 1951. Approximately $16 million has been received by the state since the resumption of leasing. About $500,000 has been paid in royalties. There is a total of $6 million in escrow pending settlement of title disputes.

In June of 1950 the U. S. Supreme

Stanolind Oil & Gas Co. crew boat at Galveston docks during period in which it was servicing a company operation 25 miles off the Texas coast. Stanolind photo.

This well in waters off Terrebonne Parish, La., was the first successfully completed offshore commercial well. It was brought in by Kerr-McGee Oil Industries in 1947, using a permanent platform with floating drilling tender alongside.

Court figuratively "lowered the boom" on Louisiana's sea-going oil operations with its decision that the State of Louisiana could not offer for lease any lands over which the United States held paramount rights.

The most puzzling question that faced oil men and public officials alike was what constituted the submerged lands belonging to Louisiana. The coastal regions are so cut into marshes, bays and inlets that it is difficult to find any one point along the entire shoreline where land unquestionably ends and the sea begins.

Subsequent to the Supreme Court decision, an engineer in the office of Oscar L. Chapman, then Secretary of the Interior in President Truman's cabinet, plotted a line on a chart which presented the Interior Department's interpretation of the perplexing problem.

This line, later to become known as the Chapman Line, presented the key to the forthcoming title dispute which has involved the oil industry in one of the most heated domestic controversies of the century.

Louisiana's official attitude toward the Chapman Line was first voiced on July 24, 1951, in a letter to the Secretary of the Interior from John L. Madden, assistant attorney general of Louisiana. Mr. Madden wrote:

"We concede that on or about March 16, 1951, the Solicitor General of the United States forwarded to the Attorney General of Louisiana copies of Coast and Geodetic Survey Charts 115 and 116; however, the charts alone are official, not the line superimposed thereon by someone presuming to act for the United States in attempting to fix the boundary between the inland waters and those extending seaward from the low-water mark.

This action, in superimposing the line, was not made under court directive, and, in the absence of the consent and approbation of some authorized representative of the State of Louisiana, must be viewed as being unilateral in nature."

The tidelands controversy became an issue in the 1952 presidential campaign; indeed, it helped to turn the tide of the election to the Republican column by drawing some of the solid-south Democratic vote for the second time in history.

On May 22, 1953, the Tidelands act became law. To a great extent it settled the offshore ownership question by recognizing state ownership of lands beneath the navigable waters within the boundaries of the state, and further adopted state boundaries in the Gulf of Mexico as they existed at the time such state became a member of the Union. A subsequent bill enacted by Congress clarified the leasing of those areas which were controlled by the Federal government in what became known as the Outer Continental Shelf.

To all intents and purposes, the matter was settled. The Department of the Interior extended the line of demarkation between state and federal lands to a point three miles seaward of the Chapman Line and the oil companies went back to work.

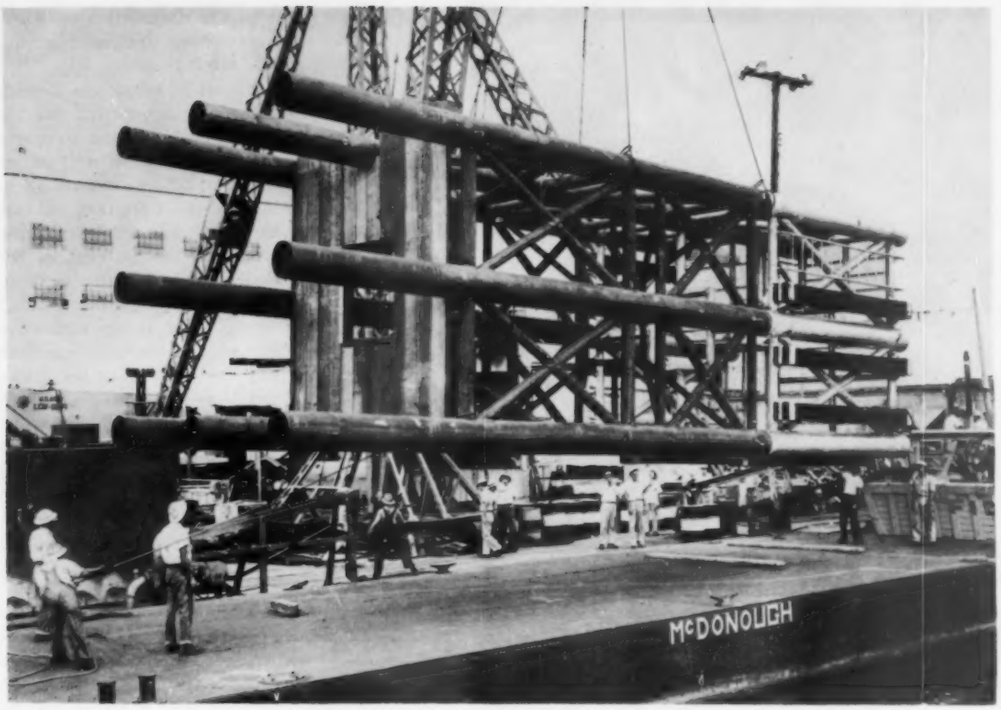
Louisiana political leaders had other ideas.

Foremost in the tidelands title fight was Leander Perez, district attorney of Plaquemines Parish (county) which has the greatest amount of coastline of any of Louisiana's coastal parishes. Long a New Deal hater, "Judge" Perez, as he is known to everyone in his parish, was once a leader in the Dixiecrat movement which sought vainly to unseat President Truman in the 1948 presidential campaign.

Skilled at political manipulations, Perez steered through the Louisiana Legislature at its last session in the summer of 1954 a bill defining Louisiana's boundaries as being three leagues, or 10½ miles, from the coast, an area that extends seaward some 27 miles from Louisiana's ragged shoreline.

"It's elementary," said Perez during an interview recently in his office in New Orleans. "Anyone who takes the trouble to go to the public library can read that Louisiana's historic boundary is three leagues from the coast.

"The Congress of the United States fixed the boundary. In 1807, Congress passed an act defining the coastline of the United States and requested the President to have the coastline surveyed to 20 leagues from shore. Apparently nothing was done about it, because in



Portable drilling barge would leave the well-head unprotected when it departs for a new location, were it not for structures such as this fabricated by Higgins, Inc., at its New Orleans shipyard.

1865 this act was amended and the Secretary of the Treasury was directed to re-define the lines dividing the high seas from the rivers, harbors and inland waters.

"He was further directed to designate these lines by suitable bearings with lighthouses, buoys or other objects, and the final authority for maintaining this coastline has been vested with the commandant of the United States Coast Guard.

"Now, the boundaries of the original 13 states were fixed by the second article of the treaty of 1783 with the British Crown. Congress has admitted 35 states into the union since the constitution was adopted, and in every instance it has fixed the boundaries of the states.

"In the case of Louisiana, the boundaries were fixed at three leagues from the coast. Four other states have boundaries defined at specific distances from the coast. They are Florida, California, Oregon and Washington. Other states, such as Texas and Mississippi, have boundaries fixed at specific distances from shore.

"The difference is this. A coastline, as defined by Congress in the Tidelands Act of 1953 as well as in the Act of 1895, is 'the line marking the seaward limit of inland waters which is in direct contact with the open sea.' In other words, the coast is that line which marks the point at which inland waters end and the sea begins. On the other hand, 'shore' is a configuration of the line marking land and water which engineers describe as the 'wet perimeter.'

"Under the Tidelands Act of 1953, Congress acknowledged ownership by the coastal states of all submerged land and resources within a minimum of three geographic miles, and a maximum of three leagues, from the coast.

"There is no difference if the boundary of a state is water or land. Who has the right to change the boundary of an inland state? Why, then, does an individual presume to have the right to say that a coastal boundary should be any different than that specified by Congress in the act of cession?"

Attached to the Louisiana act, signed by Governor Robert Kennon on June 21, is a U. S. hydrographic chart which outlines the inland waterways line as defined by the U. S. Coast Guard and, outward by three marine leagues (10.5 miles), another line which oil men now call the Perez Line.

This is what Louisiana claims as her offshore boundary.

The title dispute flared anew when, last August, the Department of the Interior invited bids for leases in the Outer Continental Shelf of 166 tracts totaling some 626,000 acres. The Louisiana State Minerals Board immediately protested this action on the grounds that a portion of these tracts were located within the gulfward boundaries of the state, and immediately called for bids on 88 of the same tracts totaling 253,000 acres.

The opening of bids by both the Department of Interior Bureau of Land Management and the Louisiana State Minerals Board was set for the same day —October 13.

While the controversy was still raging, however, Governor Kennon and members of the minerals board met in Washington with Interior officials and thereupon cancelled the state sale with the explanation:

"The Federal government claims everything beyond three miles from the mean low water mark of Louisiana.

"The state of Louisiana claims an area that exceeds 27 miles in some areas, under Louisiana State Act 33, 1954.

"Both governments offered some 88 identical tracts located between the two lines on the same date, October 13.

"In an atmosphere of mutual cooperation, it was recognized that simultaneous sales of identical tracts would cause unnecessary confusion and delay in development."

And the oil industry?

Executives were generally noncommital, although one voiced the opinion of all by saying he hoped the title controversy would soon be settled "because it is sure gumming up the works right now."

Senator Robert Kerr of Oklahoma, who is chairman of the board of Kerr-McGee Oil Industries, Inc., was questioned about the title dispute during a press conference

which followed the christening of Kerr-McGee's new offshore drilling platform in Pascagoula, Miss. recently.

"Congress cannot redefine the boundary," he said. "It is a question for the courts to decide—probably the Supreme Court. We in Congress were well aware that the question of boundaries would be a controversial issue. Congress did not attempt to fix the traditional boundaries. It merely recognized them. Whether the act of the Louisiana legislature is to be binding must be decided by the courts."

Offshore prospecting is an expensive operation. Pioneers in the business have estimated that the cost is at least two and a half times as great as drilling on shore. Leases are costly, and geological work involves the extra expense of operating or chartering boats as well as housing personnel. Construction of an exploratory well platform will cost up to $900,000 and the cost of drilling a well will range from $200,000 to $500,000. A dry hole represents the loss of an enormous amount of money.

Most businesses can learn to cut costs through experience; effect savings here and there, through a growing knowledge of shaving corners, that will amount in the aggregate to a sizeable sum.

Not so with offshore drilling. Operating costs are rising constantly. Drilling crews demand air-conditioned quarters, and that means expensive refrigeration equipment. In the early days of offshore drilling it was possible to convert a surplus YF barge into a drilling tender for a total outlay of little more than $300,000; now it costs more than twice that amount to build the newest type of tender. Crew boats, once war surplus, now cost from $100,000 to $150,000 each and the new "seagoing truck," an adaptation of the wartime LCT which once could be bought as surplus for $30,000, now runs to $150,000 or better.

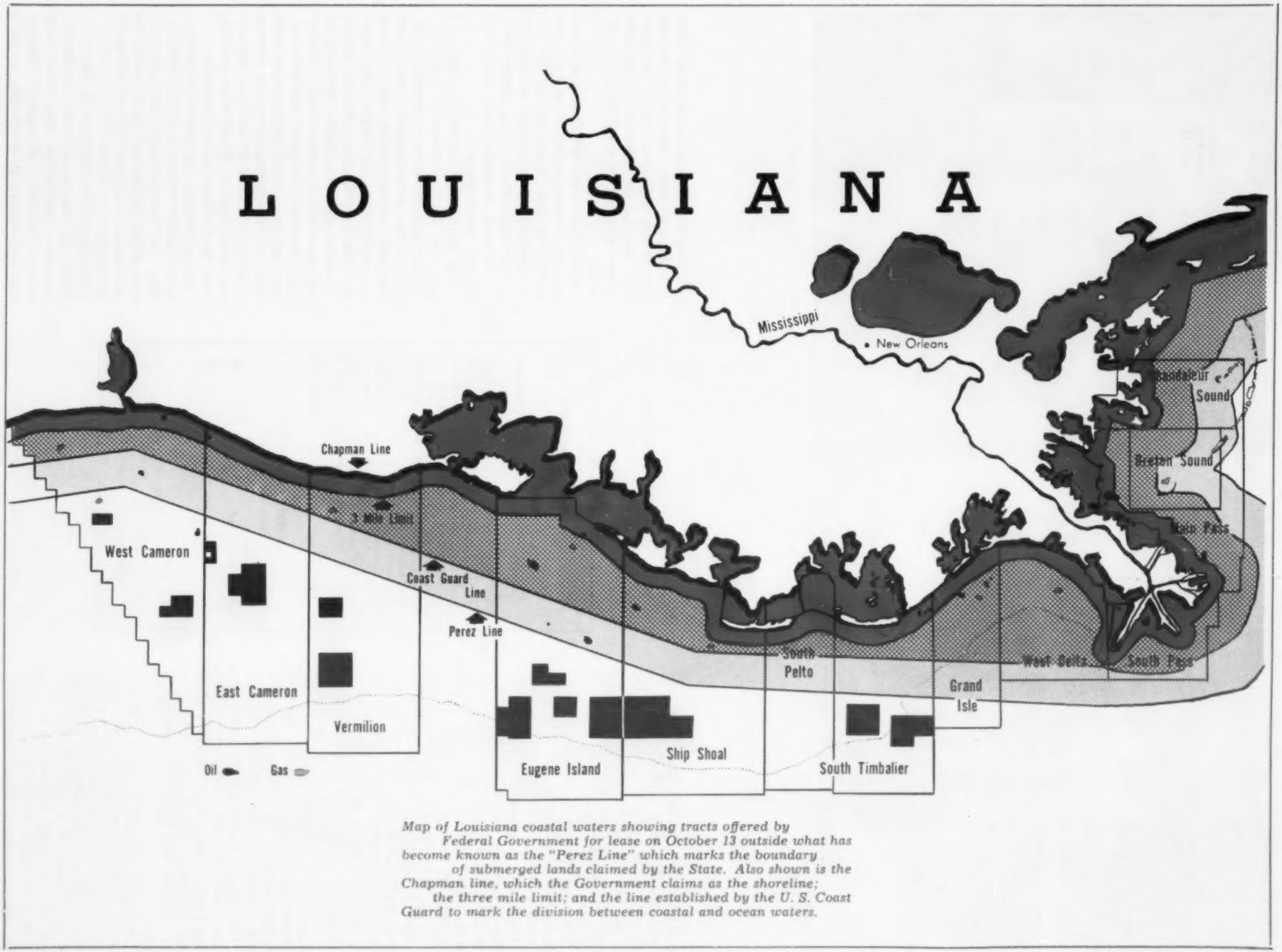
Of several oil company executives interviewed about the high cost of ocean exploration for oil, only Dean McGee sounded an optimistic note.

"When you consider that in offshore operations you have only one royalty owner," he said, "as compared with the many land tracts, the small title suits and the expense of leasing on shore; and when you consider that in the ocean you can space wells to obtain the maximum drainage of a reservoir, we may find that in the long run ocean costs may be less than the cost of drilling on shore."

However, he leaves a word of warning.

"Once you drill a well at sea you must go ahead and quickly develop the production," he said. "We cannot go along on the old pay-as-you-go basis, as with land operations. We must lay the money

Pure Oil Company's gas field off the Louisiana coast near Eugene Island lighthouse. This field was developed before the tidelands title controversy halted offshore drilling in 1951.



Map of Louisiana coastal waters showing tracts offered by Federal Government for lease on October 13 outside what has become known as the "Perez Line" which marks the boundary of submerged lands claimed by the State. Also shown is the Chapman line, which the Government claims as the shoreline; the three mile limit; and the line established by the U. S. Coast Guard to mark the division between coastal and ocean waters.

LOUISIANA OFFSHORE ACTIVITY BY FIELDS AND COMPANIES
(Production in barrels)

Field	First Prod.	1953 Prod.	6 Months 1954 Prod.	Cumulative Total to June 30, 1954
Bay Marchand Blk. 2 .. California Co.	1949	1,559,276	1,092,647	9,478,550
Breton Sound Blk. 20 .. Kerr-McGee	1953	58,743	150,914	209,657
Breton Sound Blk. 32 .. Barnsdall, Sunray, and Kerr-McGee	1949	58,139	27,304	283,630
Breton Sound Blk. 36 .. Kerr-McGee	1948	.....	1,492	1,492
Eugene Island Blk. 18 .. Shell	1954	.....	2,603	2,603
Eugene Island Blk. 32 .. Pure and Sun	1949	255,326	195,427	814,714
Eugene Island Blk. 45 .. Magnolia	1952	312,813	167,456	558,614
Eugene Island Blk. 126 . Magnolia	1950	815,981	550,662	2,459,426
Grand Isle Blk. 16 .... Humble	1948	12,934	6,168	73,187
Grand Isle Blk. 18 .... Humble	1948	372,370	319,303	2,063,603
Main Pass Blk. 24 .... California	1954	.....	44,737	44,737
Main Pass Blk. 35 .... California, Shell and Texas	1952	2,629,238	1,601,323	4,821,809
Main Pass Blk. 69 .... California and Shell	1948	1,653,910	924,901	8,163,465
Ship Shoal Blk. 32 .... Magnolia	1947	65,855	28,489	599,764
Ship Shoal Blk. 72 .... Magnolia	1950	255,394	124,955	740,938
South Pass Blk. 24 .... Shell and California	1950	1,790,854	1,927,240	5,125,917
Timbalier Blk. 34 ..... Humble	1949	(last production in 1951)		172,949
South Timbalier Blk. 52 . Humble	1950	485	.....	34,340
Vermillion Blk. 39 .... Phillips and Pure	1951	76,800	55,146	234,439
West Cameron Blk. 33 .. Phillips	1949	6,560	1,530	79,252
West Cameron Blk. 45 . Stanolind	1950	71,884	35,467	312,301
West Cameron Blk. 110 . Magnolia	1954	.....	1,419	1,419
West Delta Blk. 53	1953	45,978	170,388	216,366

PRODUCTION TOTALS BY YEAR

1947	1948	1949	1950	1951	1952	1953	First half 1954
3,217	132,299	1,064,265	4,363,141	6,560,899	6,896,250	10,042,540	7,430,561

Total production 1947 through June 1954: 36,493,172.

on the line at one time, or at least over a period of five to 10 years."

It costs more to produce than to develop an oil well. Hence, extra allowances are necessary in offshore fields or the cost will soar beyond range.

What the offshore oil industry is looking for now is something that will do the job more efficiently, at less cost.

There are three general methods of offshore drilling, according to McGee. One is the self-contained permanent platform large enough to house personnel, provide warehousing for supplies and working space for the drilling rig and auxiliary machinery. This is by far the most expensive, as evidenced by Continental Oil Company's $1,500,000 platform for its first wildcat in the Outer Continental Shelf area, 30 miles off Cameron, La., one of the farthest from the shore of any venture undertaken to date. The Continental group is now building another platform off Grande Isle in the deepest water yet encountered—95 feet.

The second method is the use of a small platform and a floating tender. This is still widely used, probably more now than ever before. This method is not obsolete, but is actually gaining in favor.

The third method is the use of the mobile platform, including the submersible barge. While as yet untried to the extent that accurate operating costs can be determined, it is believed that this will be the most economical drilling method because a single unit can drill any number of wells. These barges start at $2,000,000; good maintenance practice will demand that they be drydocked, scraped and painted annually. Yet operators feel that the mobile unit will be the answer to many of their drilling headaches.

LOUISIANA OFFSHORE PRODUCTION BY COMPANIES
1947 through June, 1954

Company	Production (Barrels)
The California Co.	19,569,246
Shell Oil Co.	7,255,805
Magnolia Petroleum Co.	3,760,397
Humble Oil & Ref. Co.	2,344,079
Kerr-McGee Oil Ind. Inc.	1,024,183
The Pure Oil Co.	958,639
The Texas Company	812,030
Stanolind Oil & Gas Co.	312,301
Continental Oil Co.	216,366
Phillips Petroleum Co.	102,084
Sun Oil Co.	67,682
Barnsdall (Purchased by Sunray)	45,126
Sunray (Purchased by Kerr-McGee)	24,234
Total	36,493,172

OFFSHORE COMPLETIONS
(By years, 1948-54)

Year	Wells Completed	Oil	Gas	Dry
1948	18	7	6	5
1949	69	29	10	30
1950	68	36	8	24
1951	8	4	4	—
1952	65	45	9	11
1953	75	59	3	13
1954	94	76	2	16
Total	397	256	42	99

From the outset, boats and airplanes became an integral part of oil field routine in offshore operations. The job of transporting personnel and material through water-bound areas and collecting oil from producing wells is in itself a major undertaking.

The oil industry turned to a vehicle of war—the landing barge—as the first solution to its water transportation problem. In the early post-war years there was still a shortage of steel. The oil industry looked to the war surplus market. The LST became a floating tender. It served as a warehouse for supplies and materials, a machine shop, a power plant, a hotel. The LST became a seagoing oil-field truck, hauling pipe, mud, water, tools and groceries to the offshore location. The fleet PT boat and the air-sea rescue boat of World War days became fast transports for personnel.

When drilling operations were shut down by the Supreme Court ruling of 1950, the wartime equipment went into moth-balls, to emerge again when the drilling ban was lifted by the Tidelands Act of 1953.

It takes numerous craft to service a single rig. Besides a floating tender, the operation requires at least three crew boats, a workboat and barges for hauling fuel and water. If the tender is not a

Radio telephone is vital part of offshore operations. Reports are made to shore base and instructions returned. Most installations also have short wave radio communication to receive weather reports. All photos on this page are reproduced through courtesy of Stanolind Oil & Gas Co.

Above: J. L. Steele, mud engineer for Stanolind Oil & Gas Co., testing mud contained in mud tanks below decks in a Stanolind tender. Below: Supper menu for Stanolind crew on location: salad, steak, O'Brien potatoes, green peas, braised cabbage, Harvard beets, ice cream, cake, coffee, tea, milk.

self-propelled unit, such as an LST, the rig also requires a sea-going tug to stand by in the event of an emergency. There are perhaps 500 to 600 vessels now working on offshore jobs in the Gulf of Mexico.

Weather is another serious hurdle on the obstacle course of ocean drilling. From June to October in the Gulf of Mexico there is constantly the threat of hurricanes, and even more dangerous are the vicious little tropical storms that make up with little warning, bringing gales up to 75 miles per hour and waves 10 to 15 feet in height.

Oil companies operating in the Gulf keep a vigilant weather-eye open. Most of them employ contract meteorologists to make area weather forecasts. When the weather is "making up," the marine managers receive hourly bulletins and carefully plot the progress of storms so that personnel can be quickly removed to safety if real danger threatens.

More and more companies are using airplanes for transportation to offshore locations. Most of them now have seaplanes for transporting officials and use in emergencies, and some have begun using helicopters for transporting drilling crews. The newer drilling barges and floating tenders are equipped with helicopter landing platforms and at least one firm, Humble Oil and Refining Company, has a helicopter atop its building in New Orleans.

Whirlibirds are expensive to operate, but they are rapidly "getting into the act."

The common problems of offshore drilling are studied by an Offshore Operators Committee, composed of the 20 companies which hold offshore leases. This committee has its headquarters in Houston and has appointed sub-committees to test various devices, work with the U. S. Army Engineers and generally study the many problems affecting all engaged in oil exploration and production at sea.

Still another group, composed primarily of marine managers of the various oil companies, drilling contractors, U. S. Army Engineers and representatives of the various geophysical services, has been appointed by the Commander of the Eighth Coast Guard district as an advisory panel. This panel was called together after the Secretary of the Treasury determined that the safety of the "artificial islands," as he described the offshore drilling platforms, was a responsibility of the U. S. Coast Guard. After months of study and investigation, the panel made its formal recommendation to the Coast Guard on September 8. If approved, these recommendations probably will become law.

The future of offshore drilling in Louisiana is, at present unpredictable. A spokesman for The California Company, subsidiary of Standard Oil Company of California, said his firm intends to continue full scale operations offshore just as long as it appears economically practicable to do so. While admitting the company is "in the red" as far as present operations are concerned, he said: "We can only look forward to some date in the future when we definitely expect to make these operations profitable."

In September The California Company began a major development program which involved the drilling of 16 wells and announced the installation of a new type of drilling platform that can drill six wells from the same structure without relocating the rig.

Continental Oil Company brought in one well in the Outer Continental Shelf off Cameron Parish and announced plans for another deep-water test off Grand Isle. Humble Oil and Refining Company inaugurated an extensive program, costing $14 million, calling for three wildcats off the Louisiana coast and two off the Texas Coast. When the State of Louisiana renewed leasing of offshore lands, Sinclair Oil Company offered the largest lease bonus in the history of the state by bidding $3.1 million on a 2,018-acre tract near Timbalier Bay, and this was followed in July by a new-record bonus of $3.25 million offered by Shell Oil Company for a 3,750-acre tract in the East Cameron area.

Still the men who "go down to the sea" for oil insist the Louisiana offshore development is not a boom.

Harold C. Teasdel, president of The California Company, recently wrote:

"Considering the tremendous amount of machinery required and the vast expenditures involved, offshore development will probably proceed in a somewhat orderly fashion—not as a boom, but as sound business."

TEXAS offshore exploration

Map showing completed wells on the continental shelf off the shores of Texas.

By Thomas Mireur

ONE OF THE STRANGEST armadas ever assembled on the Texas Coast is being fitted out for an invasion of a 16-million-acre area over the Gulf of Mexico by more than two dozen oil companies during 1955.

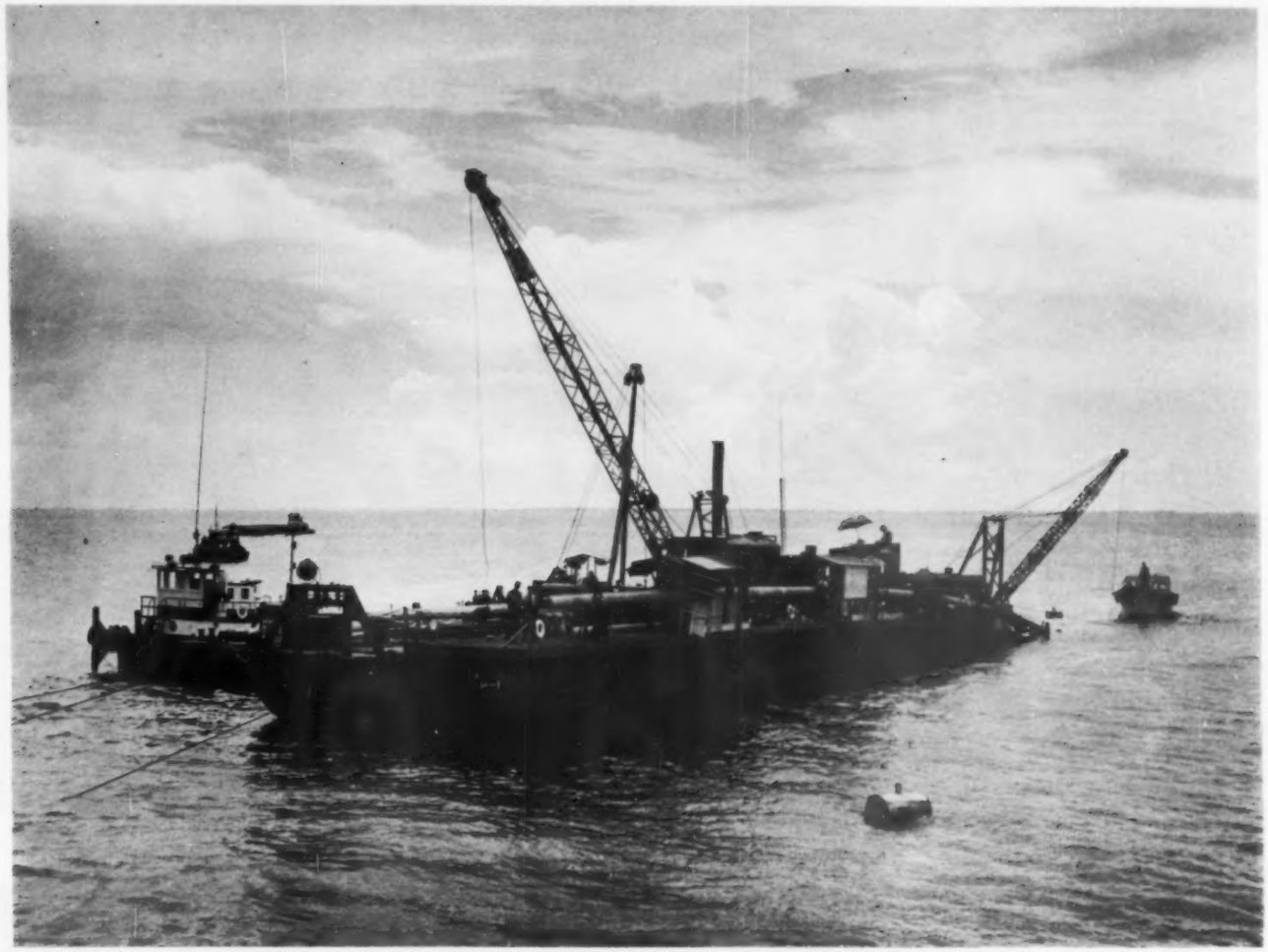
Out in this vast area, which stretches 400 miles from Point Isabel near the mouth of the Rio Grande to Sabine Pass on the Upper Texas Coast, there is an estimated 10.5 billion barrels of recoverable oil. And the oil companies have already spent millions to equip a fantastic fleet of marine rigs to get them to it. Already shipbuilders and fabricators on the Texas Coast are unable to keep up with demands, and Louisiana yards and plants have been swamped with orders to produce everything from a drilling platform to a submarine engine room.

Since 1947 oil companies have been pushing the search seaward for the new reservoir. Geophysical crews have swept a wide curve of submerged tidelands from Brownsville to Beaumont, probing from shallow depths near shore to the 150-foot water.

Some drilling has been done, but the coast as a whole has not been scratched. The searchers have moved cautiously, probing first the Upper Texas Coast and parts of the Southwestern Coast off Mustang and Padre Islands near Corpus Christi. One oil well has been discovered and one gas-condensate well.

It now appears, judging from the spirited bidding for State and Federal acreage off both the Texas and the Continental Shelf beyond, that "all hell is about to break loose," as a Corpus Christi drilling contractor put it.

Millions have already been spent in geophysical exploration of Texas offshore waters, but now millions have been paid for acreage. In Texas tidelands alone, which extend 10.5 miles seaward, the oil companies have paid the State bonuses totalling $38,600,000. In the first sale of Texas tideland acreage in 1947, oil companies bought leases on 378,305 acres for



Added to the cost of offshore drilling is special equipment such as this pipe line laying barge. It cost around $340,000 and must be kept on the centerline of the pipe line right-of-way by a tug. Another "make do" of the oil industry, it has a curved ramp on its side from which the line is paid out. This barge belongs to Brown & Root, Inc., of Houston. Photo courtesy Humble Oil and Refining Co.

$7,200,000—an average of $19.03 an acre. Last year, in December, 399,999 acres were sold for $31,400,000 at an average price per acre of $78.50.

When bids are finally totalled from the November 9 sale of federal acreage, several more million undoubtedly will be added.

Attach another 100 million dollars to these figures for construction of platforms and submersible barges in 1953 alone and you get an idea of how much it is costing oil companies just to move onto location.

Geologists believe the same formations that held the fabulous deposits of oil beneath Spindletop and Conroe extend seaward into the 150- to 200-foot depths. The coast of Texas is little more than an extension of the coastal plain which slopes gradually from an elevation of 600 feet above sea level at some inland points to around 600 feet below sea level. It is in this belt of submerged land, approximately 16 million acres, that oil companies expect to test salt domes similar to those from which inland wells along the Texas and Louisiana coasts are producing nearly one-fourth of the nation's oil. Geophysical exploration from Brownsville to New Orleans indicates that the coastal tidelands off Texas are liberally spotted with piercement-type salt domes in sufficient number to justify the expenses of a search for a Spindletop of the Sea.

This past summer, Ben C. Belt, vice president in charge of production for Gulf Oil Corp., said there is enough recoverable oil off the Texas and Louisiana coasts to add 20 percent to the nation's oil reserves.

Onshore, 62 major oilfields have been found in the 9,500,000 acres of coastal lands between Point Isabel, Texas, and the mouth of the Mississippi. The offshore acreage to be explored is 50 percent greater than that on land.

Actual production from the Texas tidelands thus far indicates that the only bright aspect of the offshore drilling at present is the shimmering horizon of the Gulf.

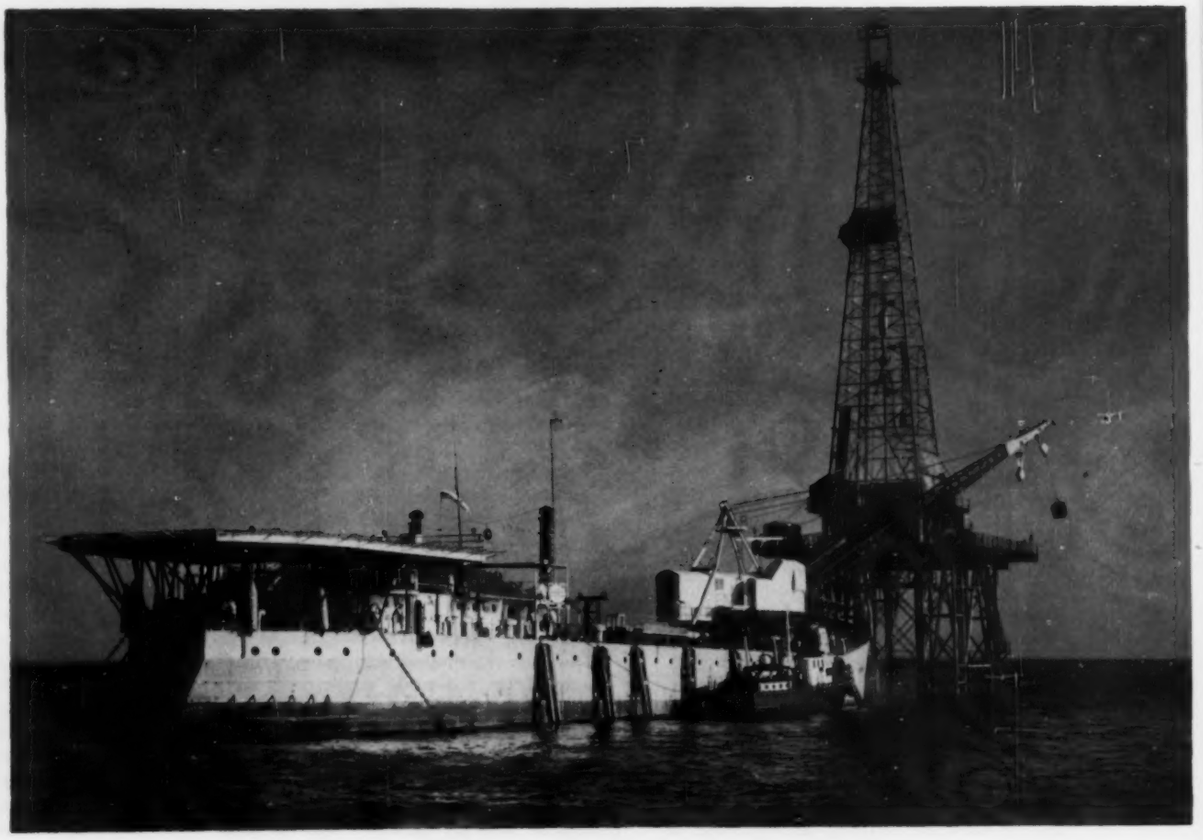
To date only 19 wells have been completed on the Texas continental shelf and eight of these were drilled on state leases prior to 1947, when the first scheduled sale of Texas tidelands was made.

Of the 11 drilled on the state shelf in acreage tracts sold at scheduled sales, there has been one gas-condensate discovery, one oil discovery, and nine dry holes. Nine of the wells completed since the 1947 sale were on the upper Texas coast and eight of them were dry.

The other upper coast completion was Stanolind's No. 1, State Tract 245, completed as a gas-condensate discovery off Galveston Island after going to a total depth of 14,017 feet.

Among the remaining completions of the 11 wells drilled, the other two were off the Southwest Coast of Texas. One was a dry hole and the other was Stan-

To cut costs in shutdown time and movement of crews and equipment of the marine rig, many oil companies have turned to the helicopter. It does away with per diem cost of a standby vessel and crew. At present, most LST tender ships will accommodate 'copters with 55-foot blades on landing docks on the after deck of the vessel. Humble Oil and Refining Co. photo.



Typical platform and tender operation in Gulf waters off the Texas Coast is the type shown here. These units are original "work horses" in offshore work and cost close to half a million to fabricate and get on location. This is a Humble rig on location for a wildcat test off St. Joseph's Island and Aransas County. Humble Oil and Refining Co. photo.

A cluster of six oil well Christmas trees are visible below the deck of this platform. Pipe lines from such platforms now run beyond 10 miles. As many as 10 wells can be drilled from these permanent platforms. Most are 40 feet above mean water level as a safety margin against possible high seas during the hurricane season. Humble Oil and Refining Co. photo.

dard of Texas' No. 53 in State Tract 948 completed as an oil discovery 1.5 miles from Padre Island off Kleberg County. It was completed in July after being carried to a depth of 9,980 feet. Production came from an upper Frio sand section at 7,760 feet.

The cost of these wells offshore runs from $35 to $45 a foot and drilling platforms of the type used on these two cost about $300,000 to fabricate and get on location.

At present, there are three drilling operations off the coast of Texas. One is Humble Oil & Refining Company's No. 1, State Tract 692, being drilled off Aransas County; Gulf Oil Corp. No. 1 on State Tract 774 off Nueces County; and Standard Oil of Texas' second well from the same platform where the above-mentioned oil well was completed in July. Operations there are in 38 feet of water from a permanent type platform.

In addition to these actual drilling operations, Humble has a platform and derrick complete for their No. 1, State Tract 794, off Aransas County, and The Pure Oil Co. is preparing to install a platform to drill a test off Galveston County. The Texas Co. is building a platform for its No. 1, State Tract 137, off Galveston Island, and Magnolia has moved onto location for an initial test on an 11,520-acre lease. The first test in this tract is scheduled for 13,000 feet and four other wells will be drilled from the same platform.

This comprises the total current activity within the Texas Shelf.

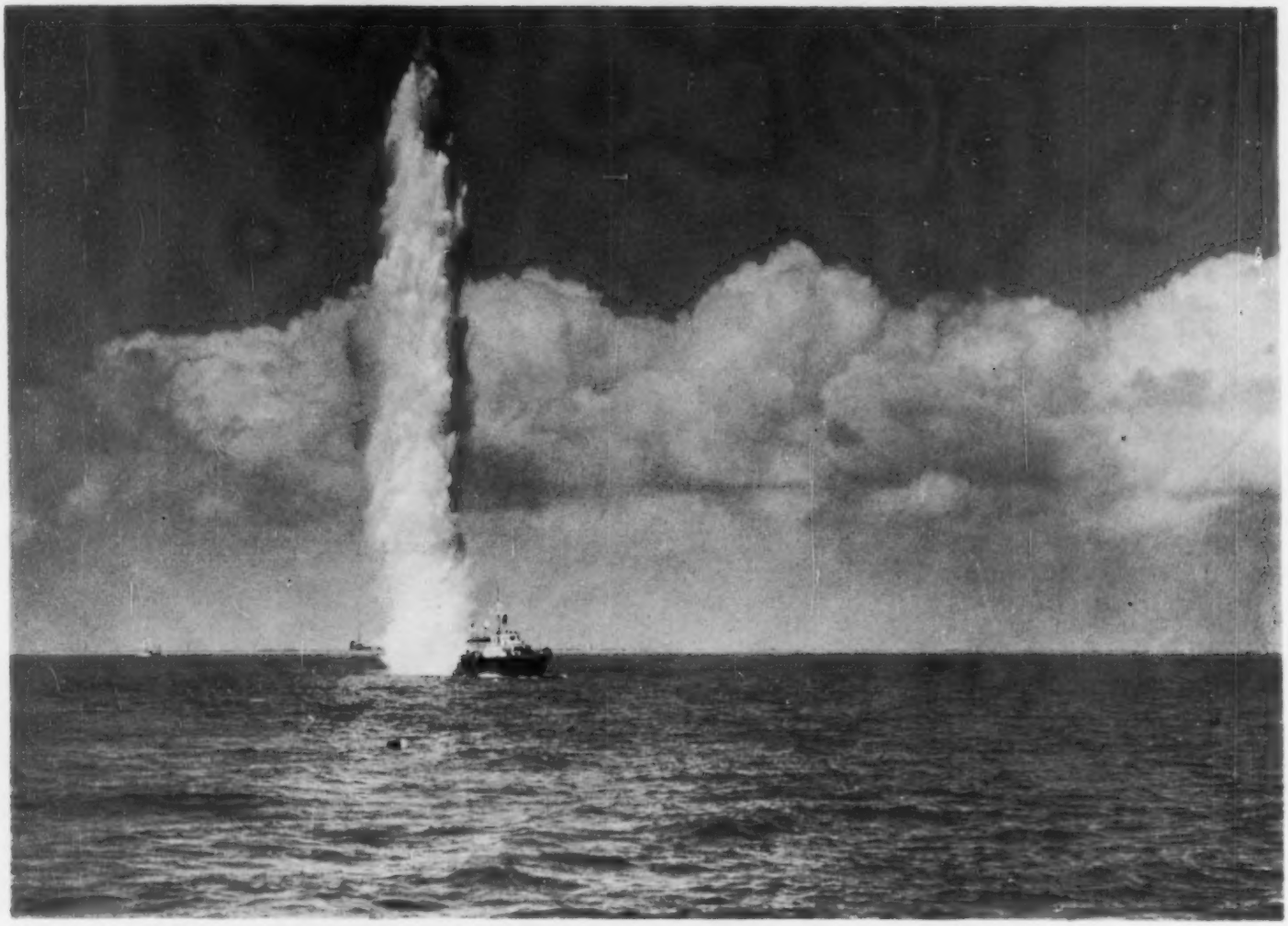
Out on the Federal Shelf, where 106,-028 acres have been offered in a sale of 38 tracts in November, there is already one wildcat drilling. It is Stanolind Oil & Gas Company's 13,000-foot test in State Tract L-141, OCS-0273. It is being drilled from a templet-type platform, 82 by 82 feet, and is in approximately 50 feet of water.

An indication of the play expected during the next 12 to 18 months may be obtained from the number of companies interested in the Texas Shelf. As of September 20 there were 28 companies holding leases on the Texas Continental Shelf. (Federal leases not included). The companies are shown in an accompanying table.

Despite this meager show, nearly two dozen large oil firms and an increasing number of independents are readying plans to drill their own leases or contract drilling in the Texas Shelf. For this they are assembling one of the strangest armadas ever seen in Texas waters. It consists of a varied assortment of fantastic marine drilling rigs that range in appearance from monstrous, steel-shinned water beetles to miniature marine communities. In some of the newer "submersibles," both men and

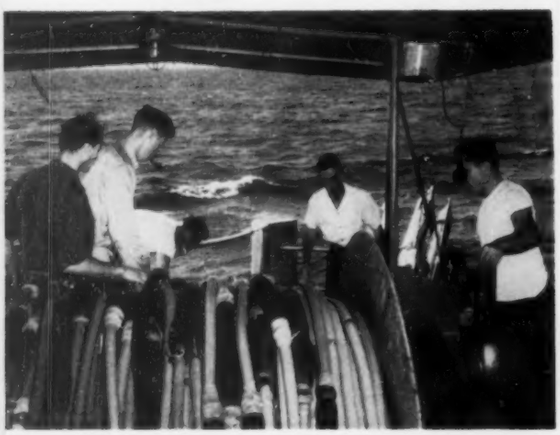
TEXAS OFFSHORE LEASEHOLDERS

	Acres
American Liberty Oil. Co.	640
Arkansas Fuel Oil Co.	3,200
Atlantic Refining Co.	38,167
Bentex (Melben Oil Co.)	25,920
Brazos Oil & Gas Co. (Dow Chemical Co.)	1,664
British American Oil Co.	3,200
Continental Oil Co.	16,320
General Oil Co.	10,080
Gulf Oil Corp.	7,040
Hiawatha (Melben Oil Co.)	31,680
Humble Oil & Refining Co.	68,595
Kerr-McGee Oil Co.	11,520
Magnolia Petroleum Co.	17,920
Ohio Oil Co.	12,103
Penn-Ohio Co.	18,240
Phillips Petroleum Co.	4,000
Placid Oil Co.	100,718
Plymouth Oil Co.	11,520
Pure Oil Co.	6,400
Seaboard Oil Co.	3,500
Shell Oil Co.	37,721
Standard of Texas	17,833
Stanolind Oil & Gas Co.	54,578
Sun Oil and Seaboard Oil Co.	30,096
Superior and Salt Dome Oil Co.	35,040
The Texas Company	16,121
Texas Eastern Transmission Co.	21,600
Tide Water Associates	12,099
Total	627,695



Thumping underwater explosions shoot a column of seawater skyward as geophysical crews continue their relentless pattern of charges across a State tract in the Gulf. Their explorations are providing substantial proof that the Gulf of Mexico holds an oil reserve comparable to the lush onshore fields of the Texas Coast. Humble Oil and Refining Co. photo.

A geophysics crew pays out listening cables over the Gulf of Mexico in search of the piercement type dome that may hide a Spindletop of the sea off the Texas tidelands. Humble Oil and Refining Co. photo.



machinery will be sunk 20 fathoms below the Gulf inside steel cages. Existing submersible barges sink the heavy machinery to the bottom in one section of the hull and the other part of the hull climbs its own legs to form the drilling platform. Still another awaiting a construction contract is a bat-like monster that latches onto the bottom like a leech and is reported to be able to drill in any depth found on the Continental Shelf.

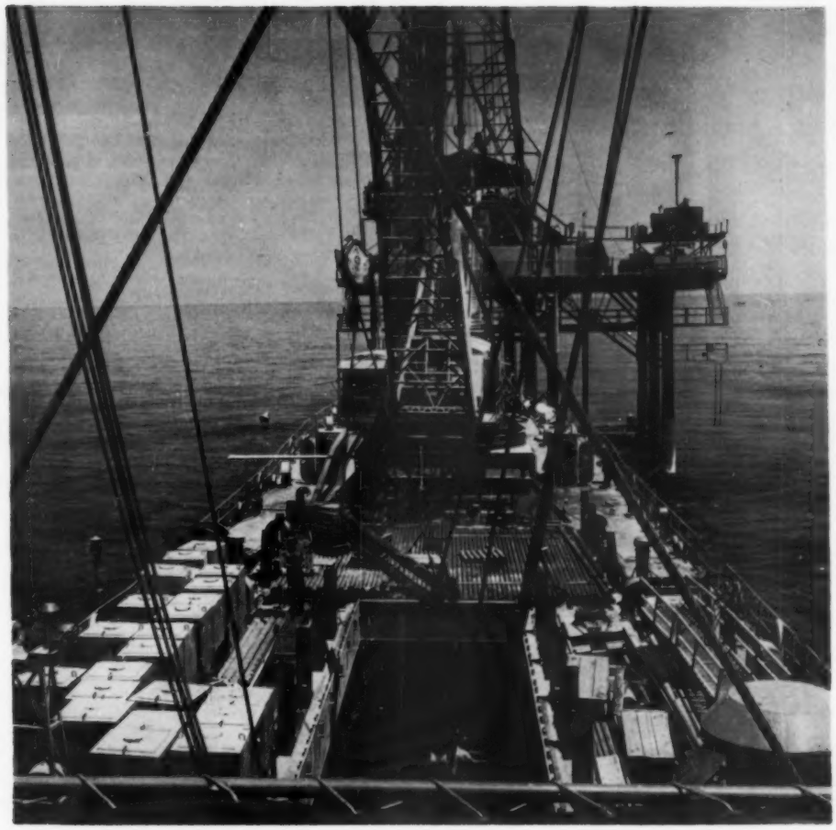
Most of the portable rigs seen or being built in the shipyards along the Texas coast run to more than 200 feet in length. The first million-dollar seagoing rig was a moveable barge constructed by Consolidated Western Steel Division of U. S. Steel at Orange. Its ultimate cost was $1,500,000 and Humble is now using it off Grand Isle, La. in a sulfur exploration.

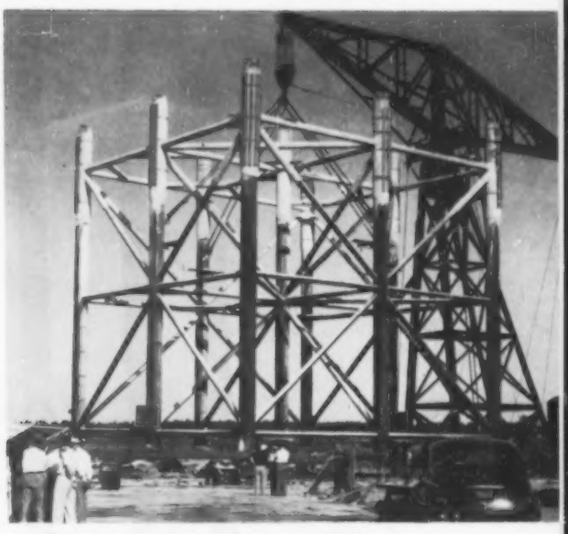
It is one of the forerunners of the "big ones" to be used in offshore work. It is 203 feet long, 70 feet wide and 8½ feet deep. Its hull sits on eight 160-foot steel caissons that are forced into the Gulf floor with hydraulic jacks. When the legs are stabilized in the bottom, the hull inches up the caissons on the same hydraulic jacks to a height of about 40 feet above mean water level. In transit from one location to another, the 160-foot legs are jacked up like pillars above the barge hull as it is towed.

Now Consolidated is building another barge at its Orange plant costing around $3,000,000. It will be 200 feet long and 117 wide, and will be leased out to oil companies in both Texas and Louisiana.

Also building on the Texas Coast is a $3,000,000, two hull moveable barge for operations in 100 feet of water. It is being constructed at Beaumont by Bethlehem Shipyards for Gus Glasscock Drilling Co. of Corpus Christi. Glasscock, who has done considerable drilling for Sunray and Atlantic in Corpus Christi Bay and on the lee side of Mustang Island, has a 30-month contract with Shell Oil Co. when the barge is completed.

The Glasscock rig consists of a lower hull, 106 by 80 feet, and an upper hull with an 80 by 50-foot platform. Like other submersibles, the lower portion of the Glasscock barge is submerged, the





Construction of templet-type platforms for offshore drilling on the Texas Coast is scheduled through December, 1955. This nine-pile support, completed September 29 by Brown & Root, Inc., of Houston, is among more than 45 to be built in 1955. It went to Western Natural Gas Corp. for a test off Matagorda Peninsula.

Drilling equipment is stored on the deck of drilling tenders as well as in the hold. Photo courtesy Stanolind Oil & Gas Co.

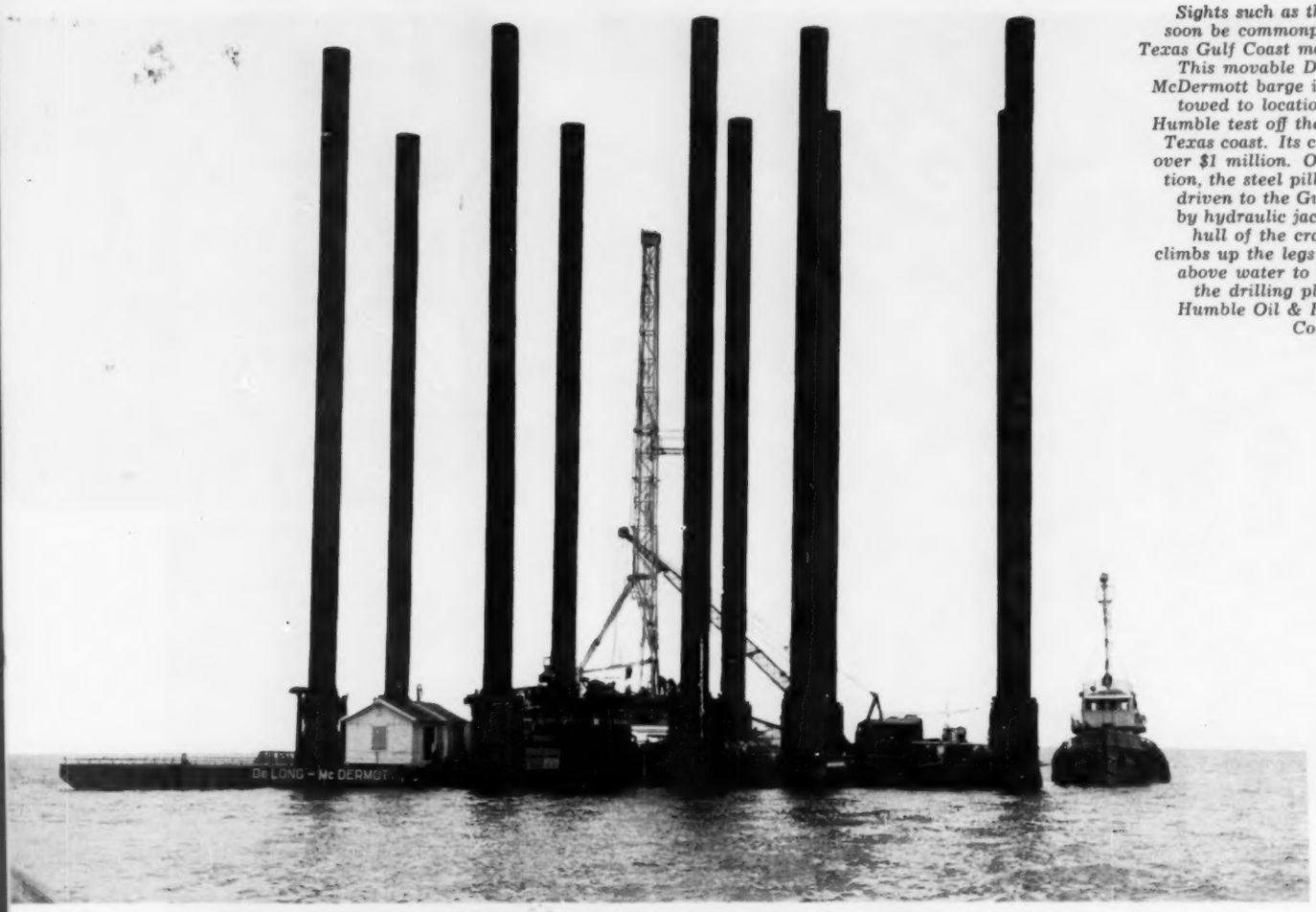
This view from below the platform of a Stanolind Oil & Gas Co. drilling platform shows how the tender is anchored to avoid excessive movement. A multiplicity of lines is required to transmit fluids and electric power from tender to rig. Stanolind Oil & Gas Co. photo.

piling or legs forced into the subsoil with hydraulic jacks, and then the upper portion of the hull is jacked to about 40 feet above water. This barge should be ready for launching in early November.

Among the other deep-water rigs is one built by R. G. LeTorneau, Inc., of Longview, Texas. It is a 3-pile mobile platform rig and is reported to be capable of operations at 100 feet and beyond. Unlike some of the submersibles, it has a single hull with 20-foot slots for legs. The legs are punched into the bottom with equipment on the barge, then the barge is elevated to about 40 feet above water as a drilling platform.

Other construction, and the largest part of it on the Texas Coast, consists of permanent type platforms. Most of the present wells in 35 to 50 feet of water are using these platforms on the Texas Coast.

Both Brown and Root, Inc. and the Todd Shipyards of Houston are jammed with orders for the next four months on these platforms.



Sights such as this will soon be commonplace to Texas Gulf Coast mariners. This movable DeLong-McDermott barge is being towed to location for a Humble test off the upper Texas coast. Its cost was over $1 million. On location, the steel pillars are driven to the Gulf floor by hydraulic jacks. The hull of the craft then climbs up the legs 40 feet above water to become the drilling platform. Humble Oil & Refining Co. photo.

Mobile units for offshore drilling

THE ADVENT of the completely mobile unit, capable of drilling in water depths up to 100 feet, is viewed by oil men as one of the most important developments of the past year in offshore operations and a major factor in the industry's attempts to reduce the costs of prospecting at sea.

The advantages to be derived from the use of such drilling devices which could be moved easily and quickly from one location to another have long been recognized by oil operators, contractors and engineers. Only one such unit had been used extensively in offshore operations in the Gulf of Mexico. That was a barge designed by John Hayward of Tulsa, Okla. for Barnsdall and inherited by Kerr-McGee Oil Industries, Inc. when Barnsdall was sold to Kerr-McGee.

That unit, capable of drilling in water up to 24 feet deep, was put into service in 1949 and has had an incredible record in shallow water operations. This unit has drilled some 40 wells and an equal number of test borings and in one five month period drilled 132,500 feet of hole in an extensive strat-hole program.

As the offshore drilling picture became intensified, however, with the passage of the Tidelands Act of 1953, the industry began looking more and more to the designing engineers to supply the answer for lower drilling costs. Plans for various types of self-contained mobile units moved off the drafting boards and into the shipyards along the Gulf of Mexico.

Last year John M. Payne of Shell Oil Co. prepared a technical paper for a district API meeting in which he listed seven mobile units then under construction or in the advanced designing stage. These he divided into three groups: submersible barges, or units having fixed legs and a floating hull which is sunk to rest on the ocean floor; mobile platforms, or units having an elevated deck maintained at a given height above the water by means of extendable legs or columns; and elevating barges, or units having a floating hull which is lifted out of the water on extendable legs.

Today, four deep-water units are in operation, three are nearing the completion stage and should be at work in the offshore areas of the Gulf before or soon after the first of the year, and two other units may soon be under construction.

Of the four units already in operation, three are of the submersible barge type. These are California Company's S-44, the much-publicized "Mr. Charlie" of Ocean Drilling and Exploration Co., now under lease to Shell Oil Co.; and the new Kerr-McGee Barge No. 44 which actually is a larger and more modernized version of the original Hayward-Barnsdall barge.

A fourth unit of this type is being built by American Tidelands Corp. and is scheduled for completion before Christmas.

In the second category is the DeLong-McDermott mobile platform, operated by The Offshore Co. and now under lease to Humble Oil and Refining Co. This unit

has been in operation since last May and a second and larger platform is now under construction. Into this category also falls the Bethlehem mobile platform which is scheduled for completion in November.

In Mr. Payne's third category of mobile designs, R. G. LeTourneau, Inc. of Longview, Texas, announced that its three-legged ocean-going drilling platform is scheduled to go into construction before year's end, and architects Friede and Goldman of New Orleans said their design for a mobile offshore drilling barge is now in the advanced engineering stage. Both units are designed for operation in up to 100 feet of water.

In order to determine the trends and thinking regarding mobile units, Mr. Payne circulated questionnaires to 18 oil companies and ten designers and contractors. He determined in this manner that:

The fixed leg submersible barge appeared to be the predominant choice in the shallow water range, with operating depth from 10 to 40 feet.

A majority of the operators were interested in deep water units and indicated various types of construction, of which both the elevating barges and the mobile platforms were the most important.

All required self-contained units, with quarters for 30 to 50 men, depending upon the size of the unit.

All also required heavy duty drilling rig of 15,000-foot rating.

Design limitations required that the shallow water units be able to withstand 100 mph maximum wind velocity and that the larger units be able to withstand 125 mph winds.

Operating limitations for the shallow water units restricted operations during the hurricane season, while for the larger units the limitations were to be unrestricted with the platforms capable of year-around operations.

The first of the so-called shallow water barges to be built was The California Company's S-44, designed by Friede & Goldman, marine architects, and built by Alabama Dry Dock and Shipbuilding Co. in Mobile, Ala.

The barge is 140 feet long, 60 feet wide and its lower hull is 12 feet deep. There is a clearance of 40 feet between the bottom of the barge and the first elevated deck tier. It is capable of drilling in 20 to 25 feet of water. Put into service early this spring, the S-44 drilled two wells and then was returned to the shipyard for modification.

Chief characteristic of the S-44 is its ability to sink to the ocean floor with full stability. This is accomplished by pontoons on the four corners of the barge, serving as legs. To sink the vessel, eight telescopic columns are pushed downward by hydraulic force, driving the pontoons to the ocean floor. As ballast, tanks in the barge hull are flooded, and the structure literally rides down the columns, remaining in an upright position throughout the entire operation.

To refloat the rig, the barge is pumped out and "rides" up the same pipes, after which the pontoons are raised to their towing position in recesses in the four corners of the barge.

The barge hull provides storage for fuel oil and drilling water in addition to ballast, which is discharged by electrically driven deep well pumps. The California rig, designed to drill to depths up to 12,000 feet, can be lowered or raised in approximately half an hour.

Additional units of this type, with a greatly advanced design, are now in the drafting board stage.

Similar in design to the California Co. rig is the drilling barge now being built by American Tidelands, Inc., newly organized contracting firm, at Alexander shipyard in New Orleans. S. F. Rowan, general manager of the firm, has announced completion by December 22.

The barge is 200 feet long, 74 feet wide and 12 feet deep, on top of which are cylindrical columns, 52 feet long and six feet in diameter, rising from the deck of the barge to the underside of the drilling platform, giving the structure a total height of 64 feet above the bottom of the hull. The two-deck platform is entirely self contained, providing machinery space and air-conditioned quarters for 40 men.

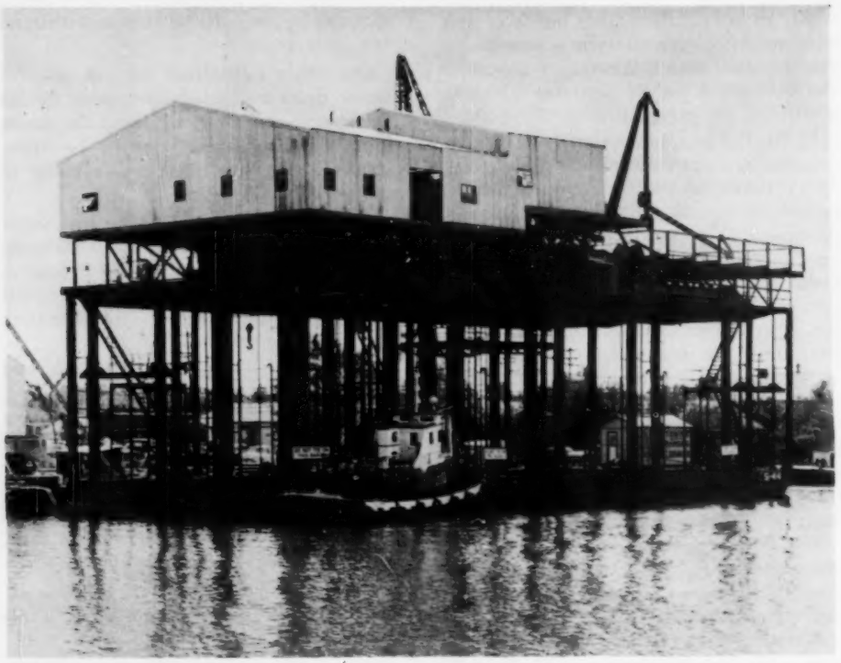
The drilling slot at the after end of the barge is 42 feet long and 26 feet wide.

Tanks for drilling water in the forward end of the barge hull have a capacity of 2,500 barrels. Two of the vertical columns will be used for storing 500 barrels of potable water and four of the columns will provide storage tanks for 1,000 barrels of fuel oil.

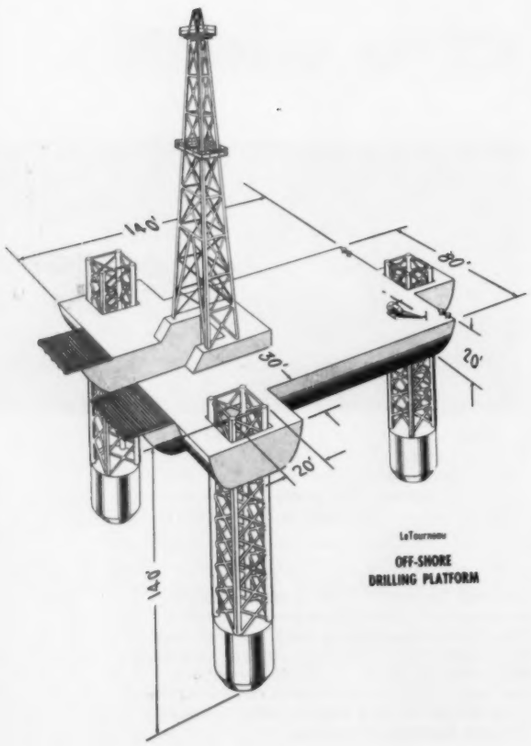
Drilling tender "J. C. Craig" built for the Continental Oil Co., Atlantic Refining Co., Tide Water Associated Oil Co., Cities Service Co. group. Photo courtesy Levingston Shipbuilding Co.

DeLong-McDermott No. 1 is a movable barge which, when photographed, had secured its steel legs in the Gulf floor and was beginning to climb up its own structure by hydraulic jacks. It sits 40 feet above the water, high enough to allow hurricane-bred swells to pass underneath. Humble Oil and Refining Co. photo.

Permanent platform drilling in the Gulf, utilizing a small platform and tender for housing crews and supplying power, is still popular despite the race to send mobile units to sea. Shown here is California Oil Company's new multiple well derrick in the Main Pass Block 69 field. Six wells can be drilled from rig simply by moving the crown block and rotary table.



California Company's self-stabilizing offshore drilling barge S-44, pictured at Alabama Drydock and Shipbuilding Co. yard in Alabama shortly before being towed to her first location. This photo shows housing for the rig and other equipment and supplies. After drilling two wells in the Gulf of Mexico, the S-44 is back in the shipyard for alterations. Chuck Francis photo.



Stabilizing pontoons are situated on each side of the forward end of the barge. The procedure for sinking the Tidelands barge will be to lower the forward end to the bottom while pontoons provide positive stability. When the forward end of the barge is resting on the ocean floor, the pontoons are locked into position and the after end of the barge is flooded and lowered. Finally the pontoons are lowered and held firmly against the bottom of the ocean with a locking device.

The procedure will be reversed in raising the barge. Rowan estimates the time necessary for each operation will not be more than three hours. He said that under normal conditions the barge can operate in 45 feet of water.

Drilling machinery for the Tidelands rig will be electrically driven by 2,000 hp diesel generators. Pumps will be driven mechanically through a compound, with power supplied by diesel engines. The mast-type or "jack knife" derrick will rise 142 feet above the platform and will have a 1,000,000-pound capacity.

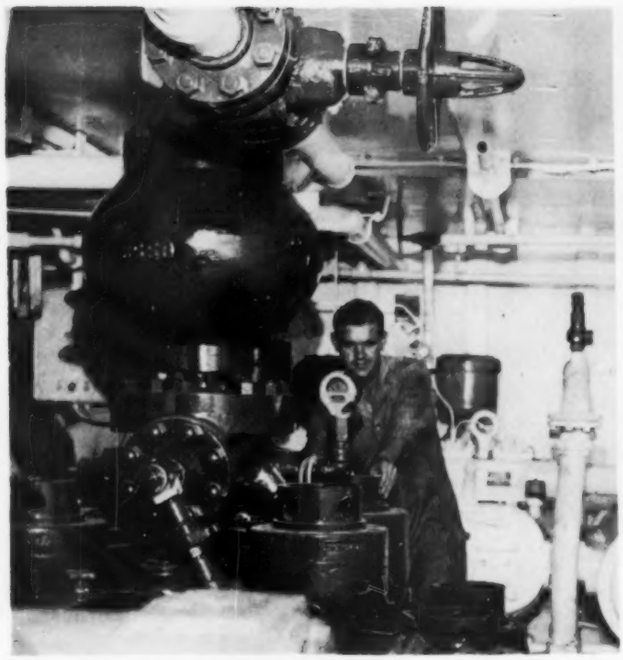
The derrick floor will rise 86 feet above the bottom of the barge, assuring safe clearance above the surface of the water. On the upper deck of the two-deck structure will be living quarters at the forward end, pipe racks amidships and the derrick floor aft. The lower deck will contain the engineroom forward, the mud system with stowage for bulk mud and bulk cement amidships. The section beneath the derrick floor will contain shale checker, store rooms and anchor winches.

Another basic Hayward design is the newly commissioned Kerr-McGee Rig No. 44, recently completed at Ingalls Shipbuilding Corp. yard in Pascagoula, Miss. and towed to Breton Sound for the first of two "shakedown" drilling jobs. The barge was designed by Paul Wolff, naval architect for Kerr-McGee, with J. T. Hayward acting as consultant.

Actually, the new Kerr-McGee rig is similar to the "old reliable" Barnsdall drilling barge except that its range has been extended to the 35-40-foot depth. Dean A. McGee, president of Kerr-McGee Oil Industries, Inc., believes Rig. No. 44 is "about as large as we'll ever try to build."

Special features of this rig are the pontoons, 14 feet wide and 12 feet deep, which extend the entire length of the main hull, 140 feet. They were designed for two purposes: first to keep the barge upright during the critical period when it ceases to be a floating vessel and settles on the floor of the ocean; second, to resist scouring by pressing against the ocean floor and filling up the holes left through erosion of soil away from the sides of the barge.

The barge is 140 feet long, 102 feet wide over the pontoons and 13 feet, six inches deep. The drilling slot is 33 feet long and 24 feet wide to permit the building of a platform to protect the wellhead while the barge is still in drilling position. McGee said that such a structure,



A unique feature of the ODECO rig is its underwater engine room inside the barge. Principal installations in the submarine engine room are two 1,600 hp diesel engines which generate electricity for drilling power. Here an ODECO engineer checks a mud pump far below the surface of the sea. Photo courtesy Shell Oil Co.

One of the two steel pontoons which give added stability to the ODECO barge is here being lowered into place to form a larger base on the bottom of the ocean. The superstructure seen on the pontoon provides platform and stairs for loading and unloading small boats. When the barge is afloat the pontoons are folded inboard. Shell Oil Co. photo.

consisting of three caissons and a superstructure, could be built for an additional $15,000.

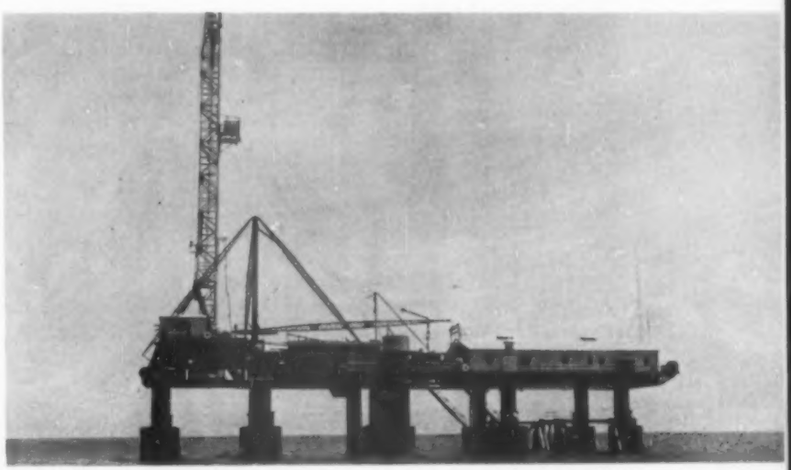
Pontoons are locked to the hull while the rig is being towed into position. Upon reaching location, the pontoons are unlocked and allowed to float while the hull is flooded. When the hull rests on the bottom, the pontoons are flooded and held in place by double-acting hydraulic rams. The sequence is reversed upon leaving a location. Jet lines on the underside of the hull prevent sticking.

The hull provides storage for fuel, potable water, drilling water and ballast.

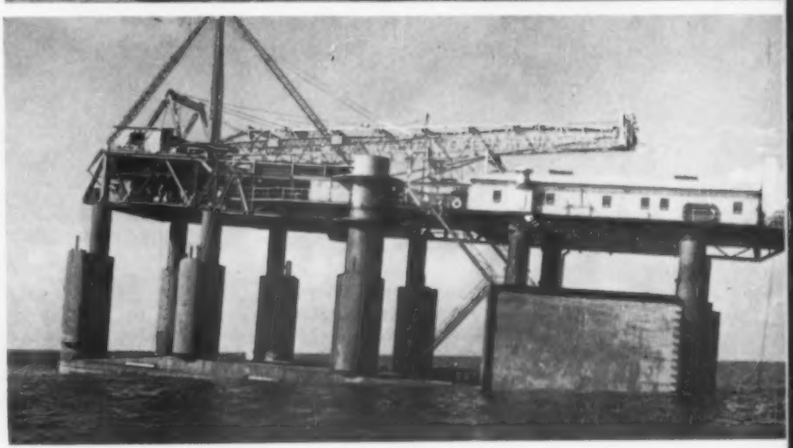
Another feature of the Kerr-McGee rig is its unusual machinery arrangement. A standard 147- by 30-foot derrick is mounted on the forward end of the superstructure. Pipe racks are above the machinery level, between the derrick floor and the crew's quarters. Located athwartships and under the pipe racks is a four-engine compound, while the drawworks is situated on the engine level, and its drum axis is fore and aft on the derrick side adjacent to the "V" door. instead of opposite it.

Independent catworks, coring reel and rotary drive are located on the derrick floor. In the engine room space beneath the pipe racks are mud pumps, high pressure cement unit, control room and electrical generators. Mud pits are located just aft of the engine room.

All machinery can be controlled by the driller from his console on the derrick floor.

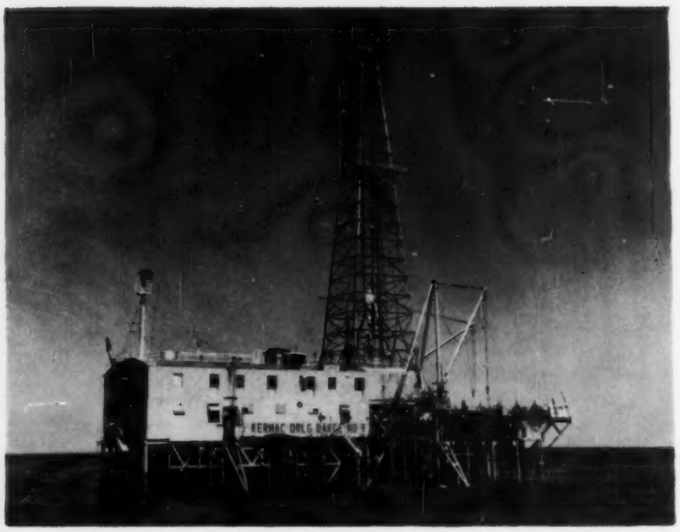


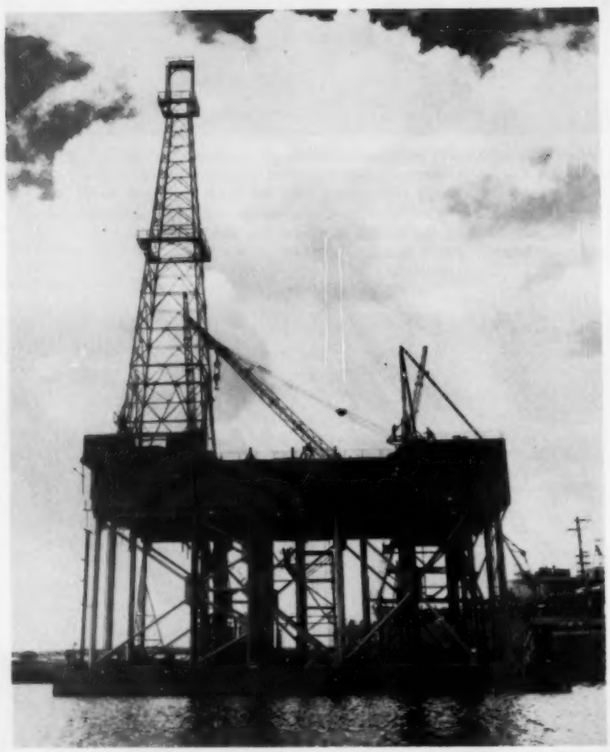
The much publicized ODECO offshore drilling platform shown here on its first Shell Oil Co. location in 31 feet of water off the mouth of the Mississippi River. On its first drilling assignment for Shell the barge brought in a new wildcat well in South Pass, Block 27, some three miles offshore. The ODECO (Ocean Drilling and Exploration Co.) platform is 220 feet long and 74 feet wide. Shell Oil Co. photo.



ODECO barge is shown here as it is slowly sunk, bow first, at the drilling site. At this point the 140-foot cantilever derrick is being raised. When the barge is on the bottom, the hinged pontoons will be lowered and flooded. Above the pontoons can be seen the air-conditioned quarters which houses 40 men. Shell Oil Co. photo.

A veteran of offshore drilling is Kermac Barge No. 3, built by Barnsdall Oil Co. and acquired in the Kermac fleet when Kerr-McGee bought out Barnsdall. This barge, the first of the mobile submersible units for drilling at sea, has been kept busy since 1949. To date this barge has drilled some 40 oil and gas tests and 40 more shallow core holes. It can work in 24 feet of protected water and 20 feet of open water. The designer was John Hayward of Tulsa, who holds the basic patents for this type of barge, such as Kermac's new Rig 44, California's S-44 and the American Tidelands barge now under construction.



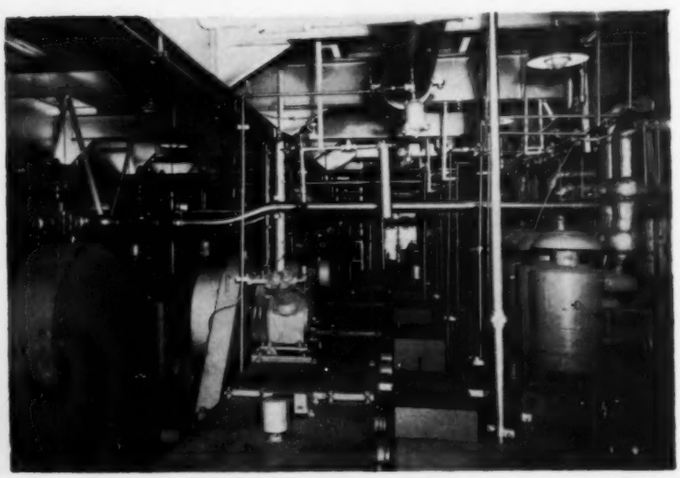


Newest drilling barge to join the growing offshore fleet is Kerr-McGee's Rig 44, which was christened Sept. 22 at Ingalls Shipbuilding Corporation's yard in Pascagoula, Miss. The hull is 140 feet long, 72 feet wide and 13 feet deep, and the height is 60 feet, 6 inches above the molded baseline or 73 feet, six inches above the ocean floor when the hull is submerged. The derrick rises 147 feet above the floor and is designed to stand 100 mph wind velocity.

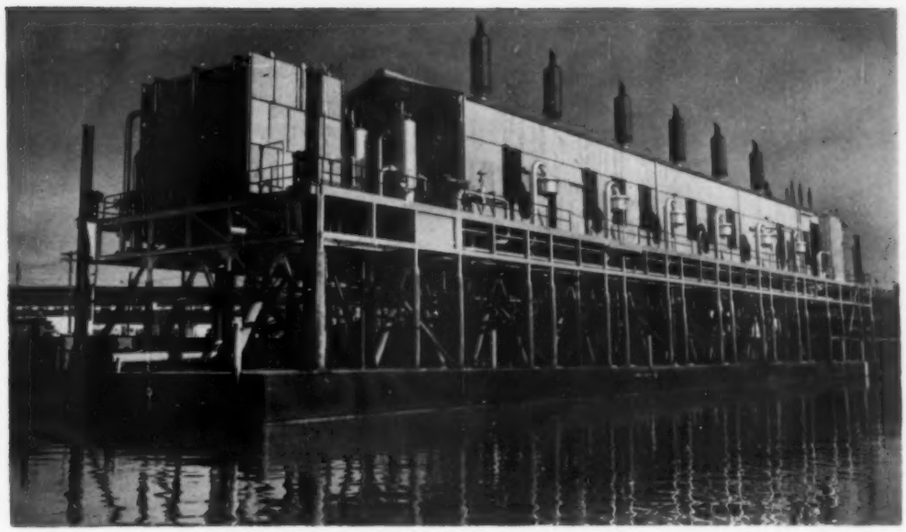
The Kerr-McGee rig can set 7-inch casing up to 16,000 feet. Main engines are four 450 hp GM twin diesel engines with torque converters. Independent catworks, rotary drive and coring reel is driven by a 300 hp twin diesel with torque converter. Electric power is supplied by two 200 kw AC Caterpillar diesel generator sets. Stringup has 400-ton capacity with twelve 1¾-inch wire lines. Material handling is accomplished by two five-ton and one 10-ton crane.

A more revolutionary type of submersible barge is that owned and operated by Ocean Drilling and Exploration Co. of New Orleans (ODECO), which is now drilling for Shell Oil Co. near the mouth of the Mississippi River. "Mr. Charlie" was tested last June and then was moved to an offshore location to drill a Shell wildcat test in South Pass, Block 27, in 31 feet of water.

"Mr. Charlie" is unique in that its engine room is inside the submerged barge and is connected with the drilling floor by an elevator which runs through one of the large hollow columns. The



Engine room of the Kermac Rig 44. At right is the battery of four 450 bhp GM diesel engines which drive the hoist and pumps. A 300 bhp diesel engine drives the rotary unit. In the compact engine room are two Clark-Ideco T-880-B triplex slush pumps; Ideco 1350-S torque converter driven draw works; two 200 KW Caterpillar diesel AC generators and a Halliburton cement unit. Driller can control all operations from his console on the derrick floor.



Compressor station "Vietti," built for The Texas Co. Photo courtesy Levingston Shipbuilding Co.

barge is 200 feet long and 74 feet wide and ten columns support the platform, which rises 64 feet above the ocean floor.

In the underwater engine room are two 1,600 hp diesel engines which generate power for drilling machinery, lights and other utilities. Fuel and ballast tanks are also built into the barge.

Stability is provided by two steel pontoons. These are folded against the side of the barge while in towing condition and are flooded and automatically fold outward during the submersion operation.

Superstructures on the pontoons provide stairways and platforms for landing personnel and materials on the barge.

The platform supports the 140-foot cantilever derrick, drawworks, mud and other storage facilities.

The ODECO rig, which can operate safely in 40 feet of water, brought in Shell's State Lease 1011 Well No. 1 in South Pass, Block 27, about three miles offshore. On drill stem test the discovery flowed at a daily rate of 265 barrels with a tubing pressure of 1,140 pounds on a 10/64-inch choke. The ODECO rig was built at Alexander shipyard, New Orleans.

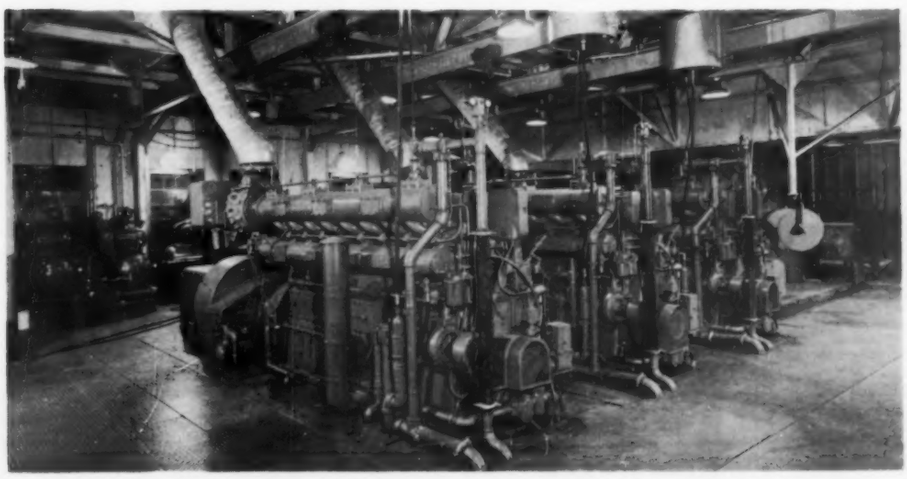
Of the various mobile platforms planned for offshore drilling in the Gulf of Mexico, the DeLong-McDermott rig was the first to go into service and is now under lease to Humble Oil & Refining Co., testing in Humble's new sulfur discovery off Grand Isle.

The operating company is The Offshore Co. of Baton Rouge, a corporation owned by DeLong Engineering Corp. of New York, J. Ray McDermott Co. of Houston and Southern Production Co. of Baton Rouge. President is T. S. Stoneman.

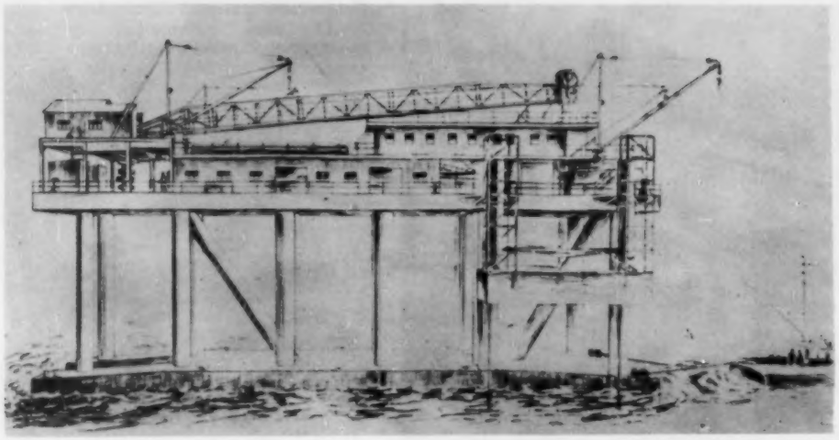
Utilizing the DeLong compressed air jacks, the barge was originally designed as a permanent platform capable of drilling in 60 feet of water up to well depths of 15,000 feet. It was made with 10 caissons, six feet in diameter and 160 feet long, although two caissons were later added after plans were changed and the device was made into a portable unit. The barge is 203 feet long, 70 feet wide and eight feet six inches deep.

The unit was fabricated by the United Steel Corp. at its Consolidated Western Steel Division plant at Orange, Texas. Like the DeLong dock barges, the engineering features of the DeLong-McDermott rig revolve around the jacks, each with a lifting capacity of 250 tons, which first drive the caissons to a sound footing in the bed of the ocean and then lift the 1,900-ton barge to the desired operating height.

Action of the jacks has been described as that of a small boy climbing a tree. He grips the trunk with his knees as his arms slide upward, then grasps the tree with his arms while he draws up his legs. The jacks operate in a similar fashion. The upper and lower halves of the jack are equipped with rubber grippers while another set of tubes circles the caisson between the upper and lower halves. The climbing action results as the tubes are alternately inflated and deflated. Three diesel 600 cf/m compressors supply air to a receiver and the jacks are operated simultaneously, six inches at a time, until the platform reaches the desired height.



Diesel engines, shock mounted, powering the main drawworks on the "W. M. Keck, Sr."



Architect's conception of the American Tidelands Co. drilling platform-barge, now under construction in Alexander Shipyard, New Orleans. Designed by Alexander's chief marine architect, H. E. Breit, Jr., the barge is scheduled to be completed in December. It is 200 feet long, 74 feet wide, 12 feet deep, and the 52-foot columns of 6-foot diameter are utilized as storage tanks for potable water and fuel oil. Machinery will be electrically driven by diesel-powered generators. The self-contained platform will have quarters for 40 men.

As originally designed, the platform would have been welded into place and the jacks removed. As a portable unit, however, the jacks must be kept in place, which uses much of the working space on the platform.

A second barge of this type, designed as a mobile unit, is now under construction at the Consolidated Western plant and is expected to be ready for service about the first of the year. The new barge will be 220 feet long, 117 feet wide and 13 feet, six inches deep and the caissons and jacks will be completely outside the working area of the barge. The unit will have 14 improved-type jacks and will be capable of operating in water up to 80 feet deep, with strength predicated in use up to 100 feet.

The new barge will be completely self-contained, with air-conditioned living quarters for 48 men, and storage on board for water, fuel, mud, pipe and other supplies.

Operators found that near the mouth of the Mississippi River, soils are not strong enough to support the DeLong-McDermott barge. However, in the Humble location off Grand Isle, operating in 46 feet of water, the rig had drilled five test holes up to October 1, and its average time for lowering, moving and raising was 20 hours.

Other mobile units and drilling platforms for offshore operations are in various stages of construction or planning. Scheduled for completion this fall at the Bethlehem Shipyard in Beaumont, Texas is a mobile platform designed to operate in water up to 100 feet deep. According to preliminary plans released, the unit will consist of a drilling platform 80 feet by 50 feet by 15 feet in the lower hull. In operation, these platforms would be towed to the drilling location, piles dropped to the bottom and forced into the subsoil by means of hydraulic jacks. The upper hull would then be clamped to the piles and the lower hull submerged to the bottom by flooding. Men would go down the access tubes and clamp the lower hull to the piles.

R. G. LeTourneau, Inc. of Longview, in announcing that Zapata Petroleum Corp. had taken an option to purchase an offshore drilling platform, said the ocean-going structure would be constructed at its Vicksburg, Miss. plant and scheduled for completion in early 1955.

The three-legged LeTourneau platform will be all welded steel construction and will feature legs, or spuds, which are electro-mechanically controlled and lowered or raised through wells located at the three outboard points around the platform.

While in towing position, the spuds will project above the platform. When the drilling location is reached, the spuds will be pushed through the wells into the ocean bottom and the platform elevated by electric motors to the desired height. The spuds will be of open framework design to offer minimum resistance to the sea, and at the bottom will be cylindrical-shaped tanks which form a solid footing on the ocean floor.

The Friede & Goldman design for a mobile offshore drilling barge, which features floating hull and a platform which can be raised to any desired height, is now in its final engineering stages. Preliminary designs show a lower hull 200 feet by 140 feet by five feet and an upper hull of 200 feet by 90 feet by 14 feet with eight- by ten-foot elliptical columns. In operation, the lower hull would be flooded until it is barely buoyant, then the lower hull would be forced to the bottom by taking up on cables with power winches. Finally the upper hull would be raised to the desired elevation by the cable and winches. The upper hull would then be secured to the elliptical columns.

Additional lateral support could be obtained by driving piling through the columns.

While the race of the mobile drilling giants is underway, practically all shipyards along the coast of Texas and Louisiana are engaged in the work for the offshore oil industry.

Higgins, Inc., in New Orleans, is building structures for protecting well heads of wells drilled by mobile units. At Avondale Marine Ways, Inc., New Orleans, work is underway on templets for a well which is to be drilled by the Continental group in the deepest water yet encountered—95 feet off the coast of Grand Isle. The steel structure, through which piling will be driven for a permanent platform, will be 118 feet high and the main deck will be 56 feet above the water line. The platform is to be erected at sea by J. Ray McDermott, Inc.

Two new non-propelled drilling tenders, for use at small offshore platforms, have been completed in recent weeks. One was the Kermac Drilling Tender II, built by Equitable Equipment Co., New Orleans, for Kerr-McGee Oil Industries, Inc. The other was the tender "J. C. Craig," recently delivered to the Continental Group by Levingston Shipbuilding Co. of Orange, Texas. The latter is said to be the largest and heaviest of its type yet constructed. Measuring 260 feet long, 54 feet wide with a hull 16 feet three inches deep, the tender has quarters for 50 men, storage for 2,400 barrels of mixed drilling mud, 13,000 barrels of drilling water, 825 barrels of fuel oil, 4,200 sacks of dry bulk mud and 2,200 sacks of bulk cement. A second tender now under construction is expected to be ready for service in December.

A submersible compressor station, the "Vietti," was recently completed at the Levingston yard. This vessel, measuring 220 feet by 48 feet by eight feet, can be submerged under water while the unit is in operation. Compressors and other equipment are housed on a steel superstructure 28 feet above the bottom of the barge. It has been designed to handle natural gas in the gathering system of the lower coastal oil and gas fields.

Air view of the filled land drill site off Seal Beach where Monterey-Texaco brought in California's first well drilled from an offshore structure. Brown Drilling Co. photo.

California
offshore test successful

FIRST TIDELANDS OFFSHORE discovery in California was announced on October 5 by Monterey Oil Company and The Texas Company. The well, drilled from an artificial island 8,000 feet seaward from the city of Seal Beach, produced 300 barrels daily of 26.4 gravity clean oil on test. Production was through a 30/64 bean with 100 psi on the tubing and 750 psi on the casing.

The Monterey-Texaco well is the first to have been drilled from an offshore structure. Earlier California production from below the tidelands had been from piers and more recently by directional drilling. The State of California restricts offshore drilling on state-controlled tidelands to areas where drainage is proved with the result that much of the oil produced from subsea structures is in harbor areas controlled by the various municipalities. The Long Beach harbor development is an outstanding example. State leases permitting directional drilling from shore locations have produced more than 250 million barrels of oil thus far.

The Monterey-Texas test is on a state lease which was granted because it was shown that the property is being drained by whipstocked wells.

The continental shelf on the Pacific Coast is far less broad than that in the Gulf of Mexico. National Petroleum Council has estimated that 200,000 acres of immediately prospective oil land is overlaid with up to 50 feet of water. This compares with about nine million acres of similarly submerged land in the Gulf.

A considerable number of oil companies have conducted geophysical reconnaissance work offshore in both State and Federal controlled territory. Since drilling on state submerged land is restricted, it may be anticipated that first major offshore work on the west coast will be on Federal lands unless state laws are amended. Work on Federal leases will require, in many instances, advances over present drilling platform design because of the depths to be encountered.

Because the location was considered proved for production, Monterey and Texaco decided on a permanent island structure even before the first test was drilled. The man-made island was designed and built by Monterey, operator of the property for the two companies.

Now that the first well has been completed successfully, Monterey plans to drill two directional wells as step-out tests. If these also are encouraging, the island will be enlarged. It may be expanded to five or 10 acres and, eventually, become part of the proposed extension of the harbor breakwater.

The Monterey-Texaco island consists first of a concrete and steel cylinder 75 feet in diameter standing in 42 feet of water. The cylinder was built of interlocking sheet steel piles and concrete and filled with sand. It has been protected from tidal action by dumping several thousand tons of rock on the seaward side of the island. Cost of the structure was about $600,000.

The circular island was supplemented with a pile-supported pier on the landward side for landing crewmen and supplies.

Brown Marine Drilling Company was awarded a contract for drilling the first test and the two directional wells. The first well was drilled to 10,162 feet and subsequently plugged back. Seven-inch casing was set at 5,906 feet and an interval from that point to 6,280 feet opened to production. After testing, the well was shut in pending installation of facilities for receiving and transporting production.

Brown engineers assembled a rig which they calculated would operate successfully in the small available space at Long Beach. Later the rig was moved into the field and a shallow well drilled for Monterey.

In assembling the rig, four Murphy dual-fuel engines were employed. Of these, three were on the floor for drawworks, rotary table and main pump power. The three transmit through a National compound and Twin Disc dis-

(Continued on page 120)

BLOWOUT

protection for offshore operations

By Earl M. Daniels*

BLOWOUT PROTECTION systems are getting special attention from offshore operators—and for good reasons. Blowouts, critical in inshore drilling, can mean complete disaster on isolated offshore islands and barges. Instant, automatic blowout control is a key part of offshore programming, both from an economical and operational viewpoint.

Looking at offshore drilling in terms of cold, hard cash, a company has an ultra-expensive investment to protect. Not counting initial outlays for seismograph studies and general exploration of offshore potentials, it has been estimated that each offshore well will cost approximately a million dollars. This high cost can be easily understood when you add up the extras of offshore operations—living quarters for crews, machinery and equipment to operate the sea-going facilities, special transportation costs, and built-in supplementary equipment such as cementing, electrical logging and servicing units which are normally called in on a service basis by land-based rigs. Then, too, offshore operators can't afford to gamble with second-rate equipment. Shutdown time (at an estimated several thousand dollars per day average operating cost) is crippling. This "first class" approach to equipment adds to the equity to be protected, and makes adequate blowout control more important than ever. It is no wonder that modern blowout protection systems, generally representing a meager portion of the offshore well investment, are rated essential insurance by tidelands developers.

Whether the operation is island, platform-plus-tender, or a self-contained floating unit, the restricted work area and isolation from land services put special emphasis on safety measures. The obvious hazards to personnel of a blowout at sea make blowout control means a number one consideration in any offshore safety program.

While equipment investment and operating safety are the big reasons for special attention to blowout prevention on tidelands projects, a third consideration has recently been introduced, that of pollution prevention on operations adjacent to beach communities. This factor has application in a well recently drilled offshore of a popular beach resort, and undoubtedly will be an influence as more and more tidelands drilling is undertaken close to populated shorelines. Such communities will very likely have an interest in measures which protect against water pollution by oil blowouts, whether in drilling or producing stages.

While the same technical considerations apply both to inshore and offshore blowout prevention control, offshore operations give special emphasis to two operating qualities. First, due to the heavy equipment investment and special safety problems, offshore rigs cannot be content with systems considered adequate for inshore operations of similar size and depth. Second, due to the confined quarters of offshore set-ups, greater stress must be given to systems which contain protected remote stations.

Since indications are that offshore drilling will go deeper and deeper with increasing pressure problems, blowout equipment for new barges and mobile marine units should generally be planned with an eye on greater control capacity. Even at today's moderate depth tidelands drilling, the most widely used hook-ups consist of three blowout preventers, combining both ram and compressible cartridge type preventers, These offshore hook-ups use larger diameter preventers than comparable inshore rigs, to give an extra measure of protection and also to accommodate the more elaborate casing programs necessary to prevent washouts. An interesting example of this triple protection is shown in the photographs and drawing accompanying this article. On this California Co. operation in the Bay Marchand Field in the Gulf of Mexico, two Hydril Type "GK" blowout preventers are combined with a ram type preventer. As wells go deeper below the ocean floor, additional preventers may be added and as many as five preventers may be hooked up in a single system.

Offshore operations, as mentioned earlier, generally tend to use larger sizes

*The Hydril Company.

of blowout preventers than similar depth inshore wells. One important reason is that a conductor jacket must be run below the deepest piling structure to guard against washing out around the piling. This conductor is usually 26-inch O.D. Intermediate protective casing is often used below this conductor in addition to the production casing. This multiplicity of casing sizes demands larger capacity blowout preventers to accommodate the more elaborate casing program.

It is rather well accepted that control of formation pressures falls in one of two categories, primary control or secondary control. Primary control is the function of the fluid column in a particular well. In the case of a drilling well, it is a column of rotary drilling fluid, in the case of a producing well, it is a column of static well fluid. This primary control exerted by the fluid column is the most important single factor in blowout control. Whenever we maintain a fluid column of proper weight, density and viscosity, formation pressure will never be a threat to the safety of our operation. However, the earth's complicated crust has produced so many variable conditions that often it becomes impossible for us to predict the fluid column requirements. In addition, what we may consider to be a sufficient volume of fluid can be swallowed almost instantly by a subsurface fissure or cavity. For this and other reasons, we may be deprived of the primary control at the very time when it is most urgently needed. Therefore, it becomes necessary to provide for secondary control in the form of equipment systems which can deliver the Sunday punch to any of nature's subterranean tricks.

For many years these secondary control systems have been grouped under the heading of blowout prevention equipment or blowout preventers. This is probably a misnomer, and correctly stated should be described as blowout prevention control equipment.

It is essential that one of the wellhead blowout control units in the blowout prevention control system be capable of permitting rotation of drill pipe and stripping of tool joints under pressure. If it is possible to keep the drill pipe moving while the fluid column is being loaded to take over the job of blowout control, then the hazard of a stuck string of drill pipe is reduced and the likelihood of a long perilous job of fishing the pipe out of the hole is minimized. Not only are fishing jobs costly (particularly on $3,000-per-day offshore operations), but some require the use of explosive charges or the taxing to maximum capacity of all the components of the rig equipment. Far worse, drill pipe may be stuck by bridging in the hole above the high pressure horizon. When the bridge is broken and the pipe is free, the well may attempt to blowout again.

Naturally, hydraulically - operated blowout prevention control systems require a source of hydraulic pressure. These fall into only a few categories. The simplest type of hydraulic pressure system can be in the form of a hand-operated core-pump, which is employed infrequently, or a small fluid pump operated by some mechanical power unit. Another source of pressure would be bottled nitrogen injected directly into the closing chamber, or against a hydraulic medium in the lines connected to blowout control equipment. The third, and preferred method, consists of hydropneumatic devices which are designed to maintain automatically a continuous supply of hydraulic fluid under predetermined pressure for operating blowout prevention control equipment. On offshore drilling locations, it is generally recommended that a continuous, predetermined pressure be maintained in an accumulator and that a secondary pressure source by pump or bottled nitrogen be available as an additional safeguard.

In these hydraulic systems, controls must be provided for directing the fluid to the closing or opening of any of the elements of the blowout equipment system.

These control manifolds are made up of the individual valves which are actuated to direct the closing or opening of the control units on the well head. It is recommended, particularly on offshore installations, that dual control manifold stations be utilized, one on the rig floor and one at a properly protected remote station located at the farthest practical distance from the well bore. Such protection on remote stations should include a corrugated steel fire wall and an overhead water spray system. It is also important, where multiple control manifolds or stations are involved, that all stations or controls are mechanically identical and operate in the same manner.

Just as lifeboat and emergency drills are part of shipboard training, blowout equipment education and drills are essential to the safety of offshore stations. Regular blowout drills increase the rig personnel's ability to extract maximum protection from the blowout prevention control system. Education and frequent drills inspire the crew's interest in the operation of this important standby equipment. Nearly every member is interested in the draw works, the slush pumps, the power slip and other major units of the drilling rig because these are units of equipment for which he hopes to be responsible as he climbs the ladder from roughneck to derrickman, to driller, to tool pusher. But the factor which keeps alive his interest in these tools is his everyday use of them. On the other hand, he may go a long time without having emergency need of blowout control equipment. These relatively long periods of emergency-free operation lull his interest and attention. Training and education in the function and use of blowout prevention control equipment should be a scheduled part of a rig's safety program. This knowledge, together with regular practice blowout drills, will make certain that each crew member will react instinctively and effectively in an emergency.

One of the newest developments in blowout protection equipment is the portable, packaged system. These systems are compactly unitized, containing blowout preventer, automatic pump accumulator and manifold control in one easily-handled skid-mounted unit. These new packaged systems are particularly adapted to offshore use, for protection as well as servicing and remedial work.

First offering of continental shelf leases brings high bonuses

Bids submitted to the federal government on its first offering of leases for oil, gas and sulfur exploration in the Continental Shelf area off the coast of Louisiana was hailed as a great success when the bids were opened on October 13 in Washington. Bonus payments approximating $130 million were offered by 23 oil companies covering 102 tracts ranging from 2,500 to 5,000 acres.

Bidding was spirited for certain tracts, a total of 326 offers being submitted for 97 oil leases and five sulfur leases. The highest cash bid was one of $6.1 million or $1,220 per acre for a tract in what is known as the Eugene Island area. It was submitted by Forest Oil Company of San Antonio. Other high bids on individual tracts were those of Gulf Refining Co. of $6,007,000 or $1,201 per acre on tract 163 in the ship shoal area and by Sinclair with its combined bid of $5,519,000 or $1,103 an acre for tract 162 in the ship shoal area. Phillips Oil Co. offered $5,266,000 or $1,053 an acre for tract 140 in the Eugene Island area.

The lowest successful bid came from Atlantic Refining in a combined bid with three other companies. The bid was for $55,000 or $22 an acre for tract 44 in the Vermillion area.

Among the heavier bidders competing for several lease units were Gulf Refining Co. which offered $35,700,000 for 22 tracts; Shell Oil Co. $18,700,000 for 13 tracts; Phillips Petroleum Co. $16,764,000 for four tracts; Kerr-McGee Oil Industries $14,664,000 for nine tracts, and Humble Oil and Refining Co. $5,119,000 for 12 tracts.

A number of bids were presented by groups of companies acting jointly. One combination of Atlantic Refining Co., Tide Water Associated Oil Co., Cities Production Co. and Continental Oil Co. offered $7,859,000 for the privilege of drilling on 13 tracts. Sinclair Oil and Gas Co., in conjunction with People's Production Co. of Chicago, Standard Oil Co. (Ohio), El Paso Natural Gas Co., and Western Natural Gas Co. bid $12,091,000 for three tracts.

Smaller tracts allotted as a result of the primary sale include those of the following companies: Union Producing Co., Shreveport, two tracts, $3,300,000; Placid Oil Co., Shreveport, three tracts, $3,145,000; The California Co., three tracts, $1,227,250; Roy Lee, Dallas, three tracts, $1,121,000; The Texas Co., one tract, $530,700; Magnolia Petroleum Co., one tract, $500,200; Standard Oil Co. (Ohio), one tract, $479,651; Stanolind Oil and Gas Co., one tract, $166,650; Superior Oil Co., one tract, $128,125; Continental Oil Co., one tract, $101,000.

A number of companies submitting bids which were not accepted have indicated that they expect to renew offers when the next bidding takes place covering areas not assigned as a result of the initial offering.

The lease auction was the first made by the Department of the Interior under the Outer Continental Shelf Lands Act passed by Congress last year. An offering of 288 tracts was originally planned, including 180 oil leases and 108 sulfur and minerals leases, but a part of these were withdrawn, being within areas on which ownership is in dispute between the state and federal governments. All of the 700,000 acres offered in October are beyond the 10.5-mile offshore line. Some tracts are as far out as 50 miles and under 80 to 125 feet of salt water.

The acreage offered for lease represents less than five percent of the offshore lands in the federal, or outer belt. Interior officials say they plan to offer other parts of the outer belt shortly with the thought that each six months may see the opening of more bids. Actually the area taken on the bids submitted is considerably less than that which was offered as no bids were received for a considerable number of tracts.

On the acreage made available for sulfur exploration, for example, only one bid was submitted. That came from Shell Oil Co. and was for five tracts with a bonus offer of $1,239,500 for the group.

Secretary McKay, who is in charge of the outer belt oil and gas area, expressed himself as greatly pleased at the results of the first offering and at the prospect of a very large revenue to the government from future bonus and royalty payments. Unlike returns from inshore leasings which go to the adjoining states, the income from lease bonuses in the outer belt accrue to the federal government and can be used for the benefit of all parts of the country.

In this connection it must be borne in mind that acceptance of bids submitted at sales such as the one of October 13 conveys only the privilege of exploring and drilling. If production of oil or gas is obtained the producers must pay a royalty and the royalty on these federally controlled districts is 16 2/3 percent instead of the 12½ percent applying to state granted leases. The annual rental on leases is $3 an acre and the minimum bonus is $15 an acre.

Offering of a second auction of outer belt lands for oil and gas development has been set for Nov. 9 when bids are to be opened on tracts covering 100,000 acres, off the coast of Texas. These, too, are beyond the 10.5-mile limit. The same conditions as to royalty, acreage, and minimum bonus per acre are specified by the Department of the Interior in charge of the auction.

Natural gas pipe line crossing the Niagara River about three miles downstream from Lewiston, New York. Crossing linked Trans-Canada Pipe Lines' Niagara-to-Toronto natural gas line with Tennessee Gas Transmission line.

Work begun to develop markets for western Canada gas

PRELIMINARY WORK of building a market for gas to be piped east by Trans-Canada Pipe Lines Ltd. is proceeding with dispatch. Trans-Canada already has sold 100 to 150 million cubic feet per day for delivery to Minnesota consumers and is preparing to import gas from the United States for temporary servicing of Ontario consumers pending completion of the line.

N. E. Tanner, president of Trans-Canada, has announced a deal with Northern Natural Gas Co. under which deliveries of Canadian gas will be begun at the rate of 100 million cubic feet daily in the fall of 1955. This will be increased the following year.

Trans-Canada will build a 24-inch lateral from its main line to deliver the gas from Winnipeg south to Emerson on the Manitoba-Minnesota border. Northern Natural will construct a line from the Minneapolis terminus of its pipe line network north to Emerson.

An application for approval of the U. S. Federal Power Commission for importation of the Canadian gas will be filed immediately by Northern Natural.

Mr. Tanner said construction of the 2,200-mile Trans-Canada Alberta-Montreal pipe line will start in the spring of 1955. Deliveries of gas to Winnipeg and to Northern Natural will begin next fall. The line will be completed to Toronto and possibly Montreal by November 1956. Meanwhile, Toronto will be served with natural gas by Trans-Canada through a pipe line now being constructed from Niagara to Toronto. This line, now nearing completion, will bring in American gas until Toronto can be served from the all-Canadian project.

The provincial government of Saskatchewan is presently carrying on negotiations with Trans-Canada in order to secure the lowest possible prices for Saskatchewan consumers of natural gas, according to a statement by J. A. Darling, chairman of the Saskatchewan Power Corp. Negotiations with the company commenced immediately following the hearings of the Board of Transport Commissioners in Ottawa last June.

The Saskatchewan government is interested in obtaining speedy conclusions to negotiations so there will be adequate time for planning for distribution of gas in Regina, Moose Jaw and Swift Current in the fall of 1955. Mr. Darling said there is an infinite amount of work to be done. Saskatchewan Power Corp. must secure equipment and make arrangements with cities to be served with natural gas. Suppliers and consumers are also interested in knowing as soon as possible if gas will arrive next year, so that equipment can be obtained.

Farther east, work of laying lines connecting the Ontario distributing system with Tennessee Gas Transmission lines in the United States has been in progress since last July. Plans were to have the connecting system completed by November 1 so that active work in building a market can be undertaken.

Late in September pipe line construction crews pulled 300 feet of 20-inch natural gas line across the Welland Canal near Allanburg, Ont. It was the second of two major water crossings on the 80-mile route of Trans-Canada Pipe Lines' Niagara-to-Toronto natural gas transmission project. The first, a dual crossing of the Niagara River near Queenstown, was completed a week earlier.

At that time, 65 miles of line in Canada was complete and only five miles of the line remained to be welded in to complete Trans-Canada's 80-mile part of the undertaking. The line has an initial capacity of 115 million cubic feet.

The line has been constructed as an integral part of the 2,200-mile Trans-Canada Pipe Lines project to bring natural gas to central and eastern Canada. Although the immediate purpose of the line is to supply the Toronto utility, Consumers' Gas Co., with natural gas from the United States until Alberta gas is available in November 1956, Mr. Tanner states that the importance of the line will in no way be diminished when the main pipe from Alberta is completed as far as Toronto.

When Alberta gas is available, the Niagara line will be used to carry it into southwestern Ontario. It may also carry surplus Alberta natural gas for sale to Tennessee Gas Transmission for distribution in the United States.

The Niagara crossing was made about three miles north of the Lewiston Bridge where the bluffs have levelled to a gentle slope. A major problem was the eight mile an hour current, described as "one of the fastest we've ever had to deal with on a job like this," and the hard rock bottom of the Niagara River, through which a ditch to receive the pipe had to be cut.

The 48-mile link between the Niagara and the main Tennessee Gas Transmission artery was constructed by Bechtel Corp. which is also responsible for the crossing. Sub-contractors for the crossing were Merritt-Chapman & Scott, blasting and dredging the ditch; and Collins Construction Co., with special equipment for pulling the pipe across the river.

Two lines, each 20 inches in diameter and 2,100 feet long, were taken across the river. Manifold systems on both the Canadian and United States sides provide for the operation of either one, or both lines. Two ditches, each seven feet deep, were cut in the limestone bed of the Niagara River to receive the pipes. After each crossing the ditches were backfilled by the dredging barge. "Skin" divers, operating from a boat equipped with a fathometer, have kept a constant check on the ditches as they must be

(Continued on page 122)

H. J. Struth is Editor of *World Petroleum Statistical Yearbook.* The first edition of this 500-page volume contains a world round-up of useful statistics, operating data and economic analyses embracing all branches of the petroleum industry. Objectively, it provides a one-volume source book of basic information constantly needed by management and operating men.

Refiners hold key to industry's stock position

By H. J. Struth

EXCESSIVE inventories in the petroleum industry are definitely attributable to the accumulation of surplus supplies of refined product. Measurement of inventories in relationship to market requirements, as of August 31, 1954, indicates that stocks of products exceeded normal levels by some 84 million barrels. At the same time, stocks of crude oil were excessive to the extent of about 11 million barrels.

All stocks of crude and products on August 31 amounted to about 774 million barrels, representing an excess supply above normal requirements of 95 million barrels. This measurement is based upon the ratio of stock to demand at the close of August, in comparison with the average ratios that have prevailed during the past three years. Stocks of crude oil amounted to 276 million barrels, while stocks of refined products, including natural gasoline, aggregated 498 million barrels. Normally, at this period, stocks of crude should not have exceeded 265 million barrels, while the combined products inventory should have been in the neighborhood of about 414 million barrels.

While imports of crude and products in the first eight months of this year have been excessive in relationship to market requirements, the facts show that the cumulative supply from foreign sources has amounted to about 253 million barrels, which is the same quantity imported during the corresponding period of 1953. The ratio of imports to demand this year is .13, compared with an average ratio during the past three years of .12. Application of the 3-year ratio to demand in the first eight months of this year indicated that imports apparently have been excessive to the extent of about 22 million barrels. This amounts

OIL REFINING SUPPLY, DEMAND AND STOCK FACTORS
12 Months Ending August, 1954

Month	Demand All Oil (mill. bbl.)	Still Runs (mill. bbl.)	Runs to Demand Ratio	Stocks All Oil (mill. bbl.)	Stocks to Demand Ratio	Gasoline Demand (mill. bbl.)	Gasoline Stocks (mill. bbl.)	Stock to Demand Ratio	Dist. Demand (mill. bbl.)	Dist. Stocks (mill. bbl.)	Stock to Demand Ratio	Resid. Demand (mill. bbl.)	Resid. Stocks (mill. bbl.)	Stock to Demand Ratio
1953														
Sept.	223.4	210.5	.94	682.2	3.05	102.8	121.0	1.18	36.7	126.7	3.45	44.9	50.5	1.12
Oct.	250.7	213.3	.85	685.3	2.73	106.8	120.1	1.12	37.0	135.4	3.66	47.1	50.8	1.08
Nov.	239.9	211.4	.88	688.9	2.87	95.3	129.5	1.36	46.3	133.4	2.88	49.6	51.3	1.03
Dec.	277.7	215.5	.78	673.7	2.43	101.1	136.0	1.34	66.7	111.9	1.68	56.1	49.4	.88
1954														
Jan.	278.7	215.4	.77	699.3	2.51	92.5	171.7	1.86	76.6	81.0	1.06	56.9	47.5	.83
Feb.	237.4	197.9	.83	692.3	2.92	89.1	179.9	2.02	54.3	70.4	1.30	49.1	47.1	.96
Mar.	259.3	214.6	.83	689.6	2.66	103.2	181.2	1.76	55.8	60.3	1.08	51.7	44.2	.85
Apr.	235.0	204.3	.87	701.4	2.98	106.3	177.0	1.66	40.4	61.7	1.53	44.6	44.3	.99
May	223.5	218.2	.98	730.5	3.27	107.3	177.5	1.65	31.1	73.6	2.37	42.0	47.0	1.12
June	234.1	208.4	.89	741.2	3.17	116.8	165.4	1.42	29.9	86.3	2.89	40.5	50.2	1.24
July*	224.5	207.5	.92	762.0	3.39	113.3	157.6	1.39	27.4	102.3	3.73	37.9	54.7	1.44
Aug.*	227.8	206.8	.91	774.0	3.40	110.3	152.8	1.39	30.4	116.2	3.82	39.6	56.1	1.42

*Preliminary estimates, based upon weekly A. P. I. reports and weekly stock reports of Bureau of Mines. Monthly data calculated from Bureau of Mines Petroleum Statements.

to a daily average of 92,000 barrels. Imports of crude oil, in relationship to domestic production during the same period, were apparently excessive to the extent of about 70,000 barrels daily.

Recognition of the need for curtailment of refining operations has recently improved the prospective inventory position. Concerted efforts of refiners to stem the rising tide of stocks appear likely to alleviate an otherwise top-heavy stock position. The most unfavorable aspect inventorywise is the heavy carry-over of gasoline stocks. As is shown by the accompanying chart, the relative stock position of gasoline is decidedly abnormal as the motoring season begins its annual decline. At the close of August, stocks of gasoline were excessive to the extent of some 23 million barrels. The carry-over this year amounts to 153 million barrels, whereas a normal carry-over should have been in the neighborhood of 130 million barrels.

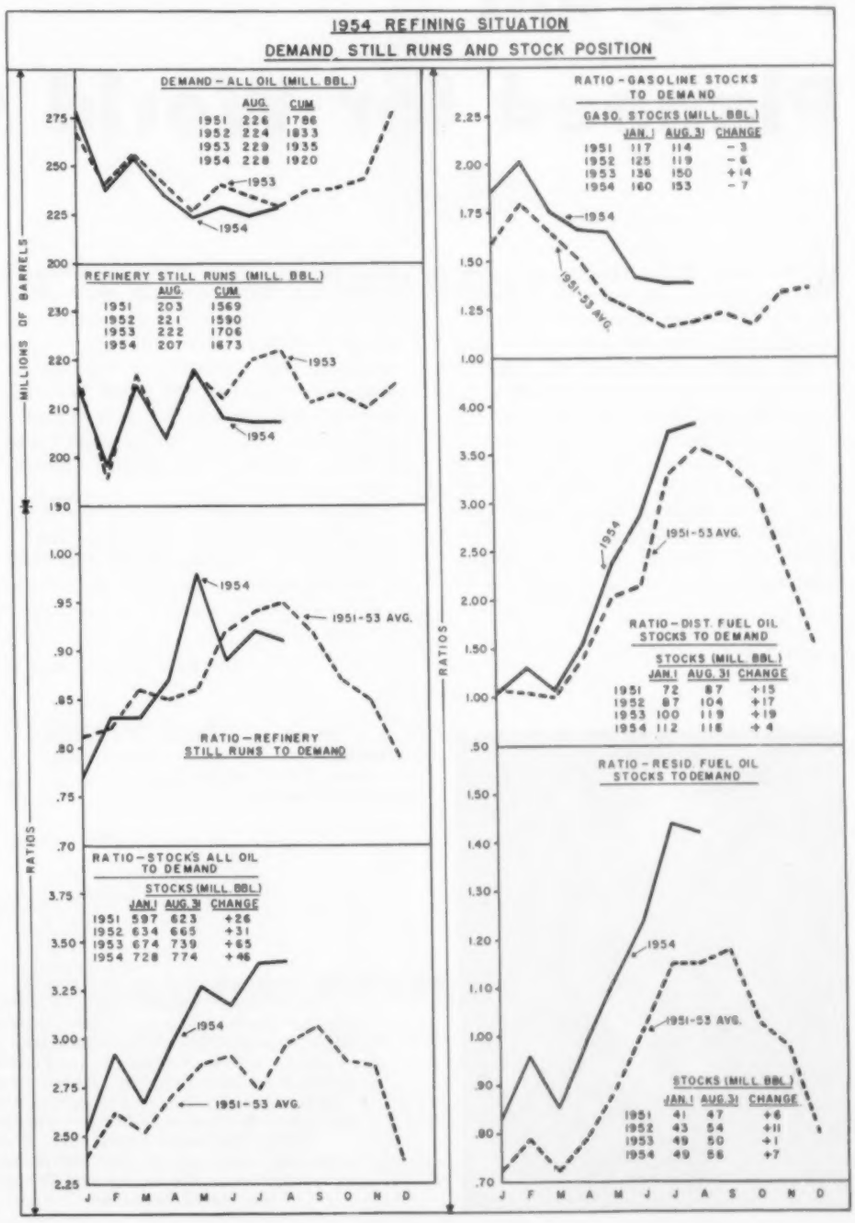
The inventory situation with respect to distillate and residual fuel oils presents comparably a more favorable picture. With the approach of the heavy consuming season for these products it is not unlikely that the marginal excess inventories in these products may be adjusted automatically by this year's fall and winter requirements.

Relative to demand, stocks of distillate fuel oil at the close of August were only about seven million barrels above normal requirements while stocks of residual fuel oil were apparently too high by some 10 million barrels. The chart shows that the stock to demand ratios of these products usually prescribe a sharp downtrend after the August peak. If this winter proves to be colder than usual, which is not at all unlikely, the excess stocks of these products could easily be absorbed. From the consumer standpoint, today's fuel oil stock position offers definite assurance of adequate supplies, regardless of how hard the winds may blow.

The unanticipated decline in the growth of petroleum products this year has been a major factor in the accumulation of excessive products inventories. Based upon earlier, optimistic predictions, refiners expanded operations in May to levels that later proved to be unjustified. The resulting stock build-up, coupled with an excessive carry-over from 1953, brought the realization that corrective measures were necessary. Subsequent curtailment in still runs by many refiners has resulted in a net reduction of 33 million barrels this year (136,000 barrels daily), compared with the corresponding period of 1953. Meanwhile, the demand for all oils in the first eight months of 1954 dropped about 15 million barrels (6,200 barrels daily) below last year's level.

At the close of May, stocks of all oils were 45 million barrels greater than a year earlier. However, at the close of August, following the cut-backs of the preceding three months, the stock increase over last year represented a net rise of only 35 million barrels. The excess stored supply of all oils at the close of August, about 95 million barrels, represented about 12 days' supply of crude and products from domestic and foreign sources. By comparison, the excess stored supply of crude oil, 11 million barrels, represented 1.6 days of domestic and foreign supply.

The maintenance of an equilibrium between stocks and demand is difficult in the petroleum refining industry, where competition for markets is a matter of individual initiative. Yet the industry is kept well informed with reliable, official statistics that provide the means by which trends may be measured. Obviously, stocks of crude oil and products should be maintained within a reasonable relationship to seasonal and annual requirements, and it is the writer's opinion that the studies presented here offer a reasonable and reliable guide to the maintenance of adequate inventories. Intelligent planning, based upon an intimate knowledge of the industry's supply and demand trends, promotes an economically sound and profitable oil industry.



Strong Technical Program Planned for World Congress

WITH MANY of the papers to be presented before the technical section of the Fourth World Petroleum Congress already in hand and others on their way to the general committee, the Congress authorities are assured of a broadly comprehensive discussion of the operating methods and problems of the petroleum industry at the meeting to be held in Rome, June 6 to July 15, 1955. Two hundred and twenty-two papers have been prepared under the direction of the national committees set up in the various countries that are to be represented in the Congress. These carefully prepared studies will deal with every aspect of the scientific and technical phases of the industry. Most of them will be presented orally by their authors and discussed at divisional meetings. In some few instances it may be necessary to read papers by title only, but all will be available in preprints and will form part of the proceedings.

Technological specialists of the American petroleum industry will figure prominently in the Congress. Some sixty-four or more papers of American authorship are to be presented at the Rome meeting. Under direction of the United States committee, the selection of subjects and of authors to deal with them has been placed in the hands of men who are recognized authorities in the fields to be dealt with by each of the nine sections of the Congress. Thus, in the highly important area of geology and geophysics (Section I), Morgan J. Davis of Humble Oil and Refining Company is in charge and eleven papers have been assembled dealing with various divisions of the subject.

Section II covers the extensive area

Dr. E. V. Murphree, president of Standard Oil Development Co. and chairman of the Permanent Council of the World Petroleum Congress.

Prof. Carlo Padovani, director of the Stazione Sperimentale per i Combustibili (Fuel Research Station) in Milan, who is active in preparations for the Fourth World Petroleum Congress. He is taking part in the Organizing Committee, the Executive Board and is chairman of the Italian Technical Committee. Prof. Padovani is also one of the three Italian representatives in the Permanent Council of the World Petroleum Congress.

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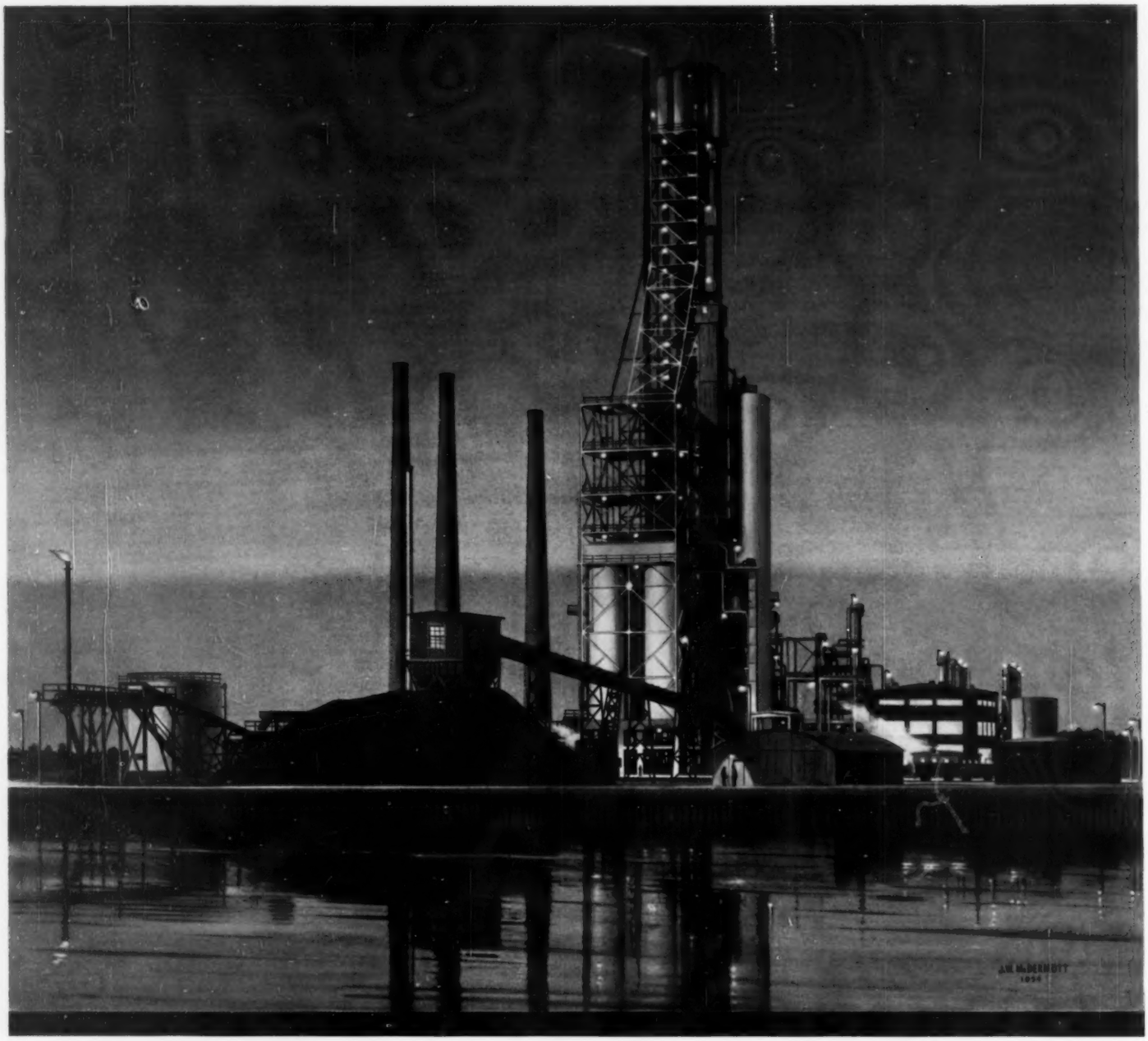

GEWERKSCHAFT ERDÖL-RAFFINERIE EMSLAND, GERMANY

The Houdriflow catalytic cracker of the Gewerkschaft Erdöl-Raffinerie Emsland, at Lingen, Germany, is the principal unit in a completely new refinery. This 17,500 BPSD cracker went on stream in the Fall of 1953.

The Emsland Houdriflow cracks straight run and coker gas oils and, in addition, desulphurizes the straight run and coker gasoline simultaneously. The refinery is currently processing a mixture of Georgsdorf and Emlichheim crudes. A unique processing scheme is employed at this refinery. No crude distillation unit exists; the Houdriflow feed stock comprises all flashed straight run materials from the crude as well as total coker effluent—gas, gasoline and gas oil. This integrated arrangement eliminates intermediate storage, thereby reducing operating and equipment costs.

A new brochure describing the Houdriflow process is available on request. Houdry Process Corporation, 1528 Walnut Street, Philadelphia 2, Pa. International Representative: World Commerce Corporation, S. A.

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of drilling and production, including drilling fluids, drilling techniques, bore hole surveys, well completion, primary and secondary production and problems of material. It is under the guidance of A. C. Rubel of Union Oil Company of California who has made arrangements for discussions by nine United States specialists in different phases of well drilling and well production.

Ten or more papers by American specialists will be presented before Section III, which deals with the highly important subject of oil processing. These have been assembled under the guidance of Howard G. Vesper of The California Research Corp. They will delineate recently developed or improved methods of desulfurization, catalytic cracking, catalytic reforming, thermal conversion of heavy residuals, chemical operations and processes. There will also be a symposium on oil from shale.

A related subject for consideration by this section is that of oil processes involving chemical conversions. Particular interest in the program of Section III is reported from all quarters. Two papers on physical operations in oil processing have been prepared under the direction of H. W. Field of Atlantic Refining Co. One relates to the fundamentals of mixing and the other is on developments in fractional distillation.

The production of chemicals from petroleum is the special topic of Section IV and American participation in the discussion of this rapidly expanding branch of the petroleum industry is under the guidance of M. E. Spaght of Shell Oil Company. Committee proceedings will deal not only with the many recent developments in this field, but also with the properties and applications of the various classes of products.

To Section V has been assigned consideration of the composition of petroleum, methods of analysis and control with the instruments and apparatus relating thereto, correlation between physicochemical properties and the composition of products and the analysis of impurities and trace constituents. R. C. Alden, head of the research division of Phillips Petroleum Company, is acting as advisor on American participation in the work of this section.

Of great practical interest to members and visitors to the Congress will be the broad ground to be covered by Section VI under the general designation of the utilization of oil products.

Papers to be presented by American delegates will discuss diesel fuels and diesel engines; others will deal with fuels suitable for today's automotive engines and new developments in engine design. W. M. Holaday of Socony-Vacuum Oil Co. is supervising the program of United States participation in this section.

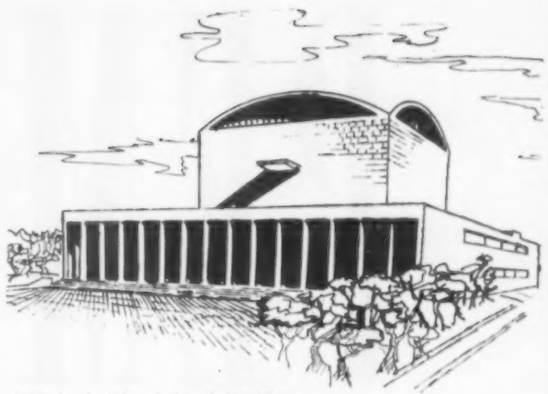
Section VII has for its subject the engineering aspects of construction of equipment, the requirements of construction materials, the problem of corrosion and other protection of equipment. J. Porter Langfitt of Pure Oil Company is special consultant in selecting subjects for discussion by American contributors to this section.

Transportation, storage and distribution of petroleum and its products provide the groundwork for study by Section VIII. As its designation indicates, the section will consider pipe lines and tankers as the main instruments of transportation, with reference to their construction and operation and such adjuncts as storage facilities and terminals. It is expected also to deal with the general transportation situation and factors affecting it. J. E. Swigart of Shell Pipe Line Corporation has been asked to guide the selection of American contributions to the proceedings of the section.

Section IX of the Congress will deal with the extensive fields of economics, statistics, education and training. Comprised in its program will be papers on all these subjects, including such special topics as terminology, standardization and the technical aspects of economic problems. To guide in the selection of papers from the United States for presentation before this section, J. W. Boatwright of Standard Oil Company of Indiana and George Corless of Standard Oil Co. (N.J.) have been selected to serve.

In planning the technical side of the Fourth World Petroleum Congress, it was felt by members of the Permanent Council and others consulted that to set up a systematic plan for the selection of subjects to be considered would result in a better rounded and more fruitful program than could be arrived at through a general invitation to members of the technical divisions of the industry to submit papers on topics of their own selection or those on which they felt best qualified to write. By inviting men of outstanding positions in the various branches of the industry to act informally as coordinators in helping to select the subjects to constitute the program of each section, it was felt that the attention of each group could be better directed to matters of primary consequence, that unnecessary duplication could be avoided and that valuable time could be saved.

There seems to be general agreement that the plan being followed will make the approaching Congress more useful to those who attend its sessions and more satisfactory to those who have given their time and abilities to the preparation of papers. Each author, with very few exceptions, will have the opportunity to present his paper in person. However, the time allowed will be definitely limited and the periods allowed for discussion will be brief. Prof. Carlo Padovani, director of the celebrated Politecnico (Stazione Sperimentale Per i Combustibili) at Milan, who is in charge of the technical division of the Congress, states that these provisions will be observed and invites the cooperation of those who participate in the technical sessions to see that they are followed.



Artist's sketch of the EUR (Rome Universal Exposition) convention hall, located in the Citta Parco, Rome, which will be the seat of the coming Fourth World Petroleum Congress.

Dr. E. V. Murphree, president of Standard Oil Development Company, who contributed greatly to the success of the Third Congress held at The Hague in 1951 and has done much as President of the Permanent Council, to spread its international recognition, has this to say about the organization and its field of usefulness:

"The earlier meetings of the Congress established it on a high plane of scientific and technical conduct and the vast expansion of the petroleum industry since the inception of the organization has greatly enlarged its opportunities to be of service. Science and technical progress fortunately have no national boundaries. In an era where the greatest need exists among the peoples of the earth for a better understanding of one another, the mere bringing together of the representatives of a basic industry like petroleum from the four quarters of the globe is bound to be helpful.

"In the case of the World Petroleum Congress however, the value of its quadrennial gatherings is by no means confined to this aspect. Oil and gas today are so closely intertwined with the whole industrial fabric that the spread of knowledge about the industry and the practical application of this knowledge are among the most important factors leading to the greater efficiency of human effort, a more comfortable existence and a higher standard of living for all.

"Petroleum is a great creator of new jobs, higher productivity, greater ease and enjoyment in living. Through the free interchange of ideas and information about petroleum's power for betterment, the Congress has an exceptional opportunity to be of worldwide usefulness."

PEMBINA

Expensive exploration permits disappoint buyers and wet summer retards development of Canada's largest known crude reserve.

By Leslie Orr Rowland*

CANADA'S LARGEST single reserve of crude oil, with at least one billion barrels recoverable, has turned out to be both a source of satisfaction to its discoverers and a sore disappointment to several other companies which came into the land play after the discovery. In another phase of development, it has been equally disappointing to the discovery team in its necessarily slow rate of drilling out and a benefit for the same reason to every other producing field in Alberta.

The Pembina Cardium sand oil field, 75 miles southwest of Edmonton, is thus the greatest paradox in the seven-year history of active oil exploration and development since the Leduc discovery in February 1947 put Alberta prominently on the world-wide oil map. Its potential is so tremendous that it has been calculated very conservatively to be capable of supporting more than 3,000 wells drilled on 80-acre spacing. On the minimum economic allowable, under existing Alberta Conservative Board rules, this producibility could practically swamp the whole market for Alberta crude for the next two or three years if it were to be developed as quickly as offset obligations on an engineering basis are likely to require. If it had not been for the fact that the wettest summer since 1899 kept drilling operations shut down for weeks on end and suspended start on a pipe line from the field to the Edmonton refinery and pipe line terminal area until this fall, the Pembina field would probably by now have 127 wells capable of producing instead of the 27 reported by the Alberta Conservation Board in its weekly report for September 20.

The effect of the small number of completions, and of the inability of operators to move crude out of the field, both due to impassable roads caused by the excessive and almost continuous rainfall throughout the summer, has been to sustain the producing rates of all the other fields not on economic allowables. With a normal development rate of even three or four new producers a week, the inclusion of Pembina in the Alberta proration scheme would have required cutting all the other major fields by at least 10 or 15 percent during the past four or five months.

The topographical conditions in the field area are difficult for anyone to visualize who has not walked or tried to drive over the muskeg and swamp which make up a large part of it. To begin with, the area is almost uninhabited, and therefore there has been no substantial amount of road construction in the past. In addition, the swampy ground and the muskeg areas, which for road building purposes have no foundation, have been closed to any access by construction crews all summer so that almost no access roads have yet been built to service the potential wellsites or the pipe line right-of-way.

It is complicated by the existence of several rivers, creeks and watercourses which cannot be bridged easily. These have all been running at full capacity and have flooded several times during the summer, delaying all projected road construction programs until next year. Completion of the pipe line, scheduled for some time in November, will not provide a solution to the problem of completing wells but will only make it easier to produce the wells which have already been completed.

Because of the slow development, and particularly its restriction to a fairly small area in the vicinity of the original discovery and two nearby extensions, subsurface information has not been secured to as great an extent as had been expected when the spring drilling programs were set up. Similarly, the disposition of Crown reserve holdings established by conversion of the original exploration reservations to lease has been delayed because of the obvious inability of prospective purchasers to get on their parcels to do any drilling. A substantial amount of research was done through last winter however, on the information then available, and a report presented to the spring meeting of the Canadian Institute of Mining and Metallurgy in Calgary contains a good many valid conclusions.

Attributing to the discovery of May 1953 the title of "possibly the most significant event in the development of the oil industry in Western Canada since the Devonian discovery at Leduc in 1947," this report by S. R. L. Harding, of J. C. Sproule & Associates, (prominent Calgary geological consultant firm) concludes that the possibilities of future discoveries in the Cardium sand formation are almost unlimited in a belt which extends for more than 500 miles along the Rocky Mountain foothills front. In this region, which extends from southern Alberta northwest to the Grande Prairie area and adjacent British Columbia, "the probable Cardium oil and gas reserves in Alberta stagger the imagination."

The results of development and extension drilling to date can best be appreciated after consideration of the history of Cardium sand exploration in Alberta. Dr. Harding pointed out that the name "Cardium" was first extended in 1863, by Dr. James Hector, a geologist attached to Captain John Palliser's historic expedition, to the whole section of marine Cretaceous beds exposed along the Bow River west of Calgary. Not until 1908 was the terminology restricted to the sandy

*Editor, *Oil in Canada.*

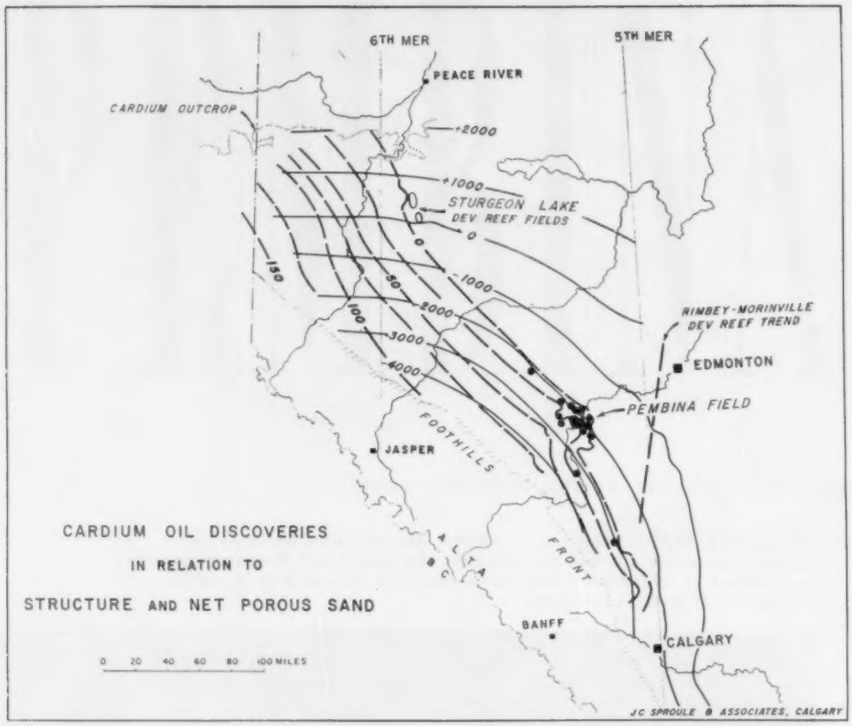
Drilling rig in the Pembina field in Alberta, discovered in mid-1953 by Socony-Vacuum Oil Co. and associates. By the end of 1954, Socony expects to have drilled 75 to 100 producing wells here and may drill as many as 600 wells in Pembina ultimately.

marine beds with which the name is now associated.

Significantly, outcrops of the Cardium occur throughout the length of the Alberta foothills and northwest into the British Columbia foothills. A tongue of outcrop also extends along an east-west line of strike from Pouce Coupe towards Lesser Slave Lake. Most of the outcrop areas have been mapped and it is possible to make reliable regional correlations.

The formation thickness varies from as little as 30 feet to as much as 650 feet along the foothills, where its typical structure consists of two ridge-forming marine sandstones with minor conglomerate beds separated by a sandy shaly zone. In places it may contain as many as five separate beds, but it may consist of only one in the extreme south. East of the field area the study showed the sands become generally less effective as oil or gas reservoirs and the author concluded that an isopach of the total Cardium zone is not as significant as a map of the net porous sand. A consideration of the self-potential curves of electric logs of individual wells, even if approximate, provides a fair correlation with the rock samples, and it is concluded that the electric log criteria are useful in calculating productivity, as verified by specific checks. Where closely spaced control is available —so far only in the areas mentioned close to the discovery wells—the line of porosity pinchout has been found to be very irregular.

The structural history, according to Dr. Harding's study, contributes to an understanding of the possibilities of the region. Prior to the Rocky Mountain uplift, the Cardium was a shoreline conglomeratic phase fingering eastward into a sandy phase and thence to one of dirty, tight, silty sand and shale. The Rocky Mountain uplift reserved the attitude of the sands,



inclining the strata westward and creating updip traps for oil and gas west of the pinchout zone wherever cleaner porous sands were formed by the winnowing action of wave wash or currents. The author points out, however, that other factors contributed to the accumulation of oil pools in the Cardium, and that lateral permeability barriers are also an important control.

The principal discoveries, according to the Harding study, have been made a few miles downdip from porosity pinchouts. The potential of any individual accumulation, as commercial production, will depend on quality of the sands, and recoverable oil and gas will be found only in the cleaner and better sorted sands. Low permeability often appears as a result of poor sorting.

Reserve calculations, for these reasons, will depend on local factors for any particular parcels. An average good well, based on the limited experience of completions to date, would have 15 percent porosity and effective pay zone thickness of 15 feet, making a recoverable reserve of 2,500 barrels per acre or 1.5 million barrels per section of eight wellsites. An average well on 80-acre spacing would thus be good for recoverable reserve of 200,000 barrels. It must be understood, of course, that some wells will be a great deal better than the average while a great many will be poorer than the average. Completion practice indicates the extensive use of fracturing treatment to increase permeability in tight wells, as the formation has proved to be far from uniform in this factor. Owing to the impossibility of getting production tests, it has not been possible as yet to draw even elementary conclusions about the effectiveness of the treatment.

The production picture has been well illustrated by the trend of weekly production figures, as drawn from the Conservative Board reports:

Week Ending	Average b/d
June 28	468
July 5	1,527
July 12	1,910
July 19	2,127
July 26	2,050
August 2	1,147
August 9	219
August 16	309
August 23	446
August 30	146
September 6	nil
September 13	124
September 20	134
September 27	328

At the time of writing, the Conservation Board was not hopeful of getting any more production from the field until the fall freeze-up, when there would be some chance of moving tank trucks over frozen roads and trails. The weather at the end of September was, if anything, worse than it had been at any time since the beginning of August. The contrast between the actual production figures and the calculated allowable, under the Conservation Board formula, can be seen in the fact that the 27 wells capable of producing at the last reporting date would have had an allowable of more than 6,000 b/d if they had been capable of getting production out of the field.

In its broader aspects, the extension drilling to the northwest of the main producing area has been extremely disappointing. At a Crown reserve sale of exploration permits last winter, two companies paid astronomic prices for the right to explore a total of eight townships. Each block of four townships conferred on the purchaser the right to explore the entire block, including wildcat drilling, but in the event of a discovery being made, the holder would have to convert the reservation to lease, retaining not more than half the acreage, including not more than nine square miles in a solid block around the discovery. The remainder would have to be returned to the Alberta Government for redisposition, probably in the form of Crown lease for a cash bonus.

Imperial Oil Ltd. paid $11,087,533 for Townships 51 and 52 in Ranges 10 and 11 west of the Fifth Meridian. Texaco Exploration Co., Canadian operating subsidiary of The Texas Co., paid $13,000,-125 for Townships 49 and 50 in Ranges 10 and 11 west of Fifth, immediately south of the Imperial block. The southeast corner of the Texaco block is ten miles northwest of what was then the nearest producing well in the Pembina field as defined by the Conservation Board. Three strategic wildcat wells along the east boundary of both blocks were in the course of drilling when the Crown auction sale was held on January 26, 1954, but extreme secrecy in the operations of Stanolind Oil & Gas Co., holder of the large reservation on which these wells were drilled, prevented any information leaking out which might have given a clue as to the possible productivity of any portion of the blocks up for sale.

The two parcels, part of the provincial forest reserve holdings, are designated as the Cynthia Forest Reserve. Each contains 92,160 acres. The prices paid averaged $140 per acre, more than three times as high as the previous record cash bonus paid for a much smaller block three years earlier. The price was unique for such an enormous exploration block, and it was generally expected in the industry that some phenomenal results would come out of the exploratory drilling done on both parcels.

This expectation has been severely disappointed by the course of wildcatting on the Imperial block in the ensuing eight months. Possibly as a result of the failure of the Imperial operations to reveal anything of great promise in a widely spaced six-well drilling program which covers

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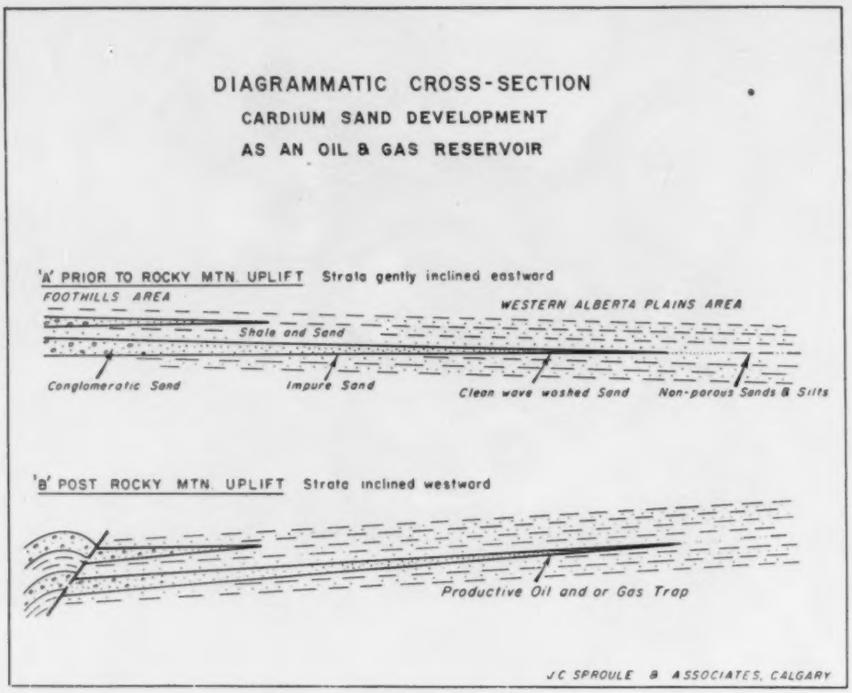
DIAGRAMMATIC CROSS-SECTION
CARDIUM SAND DEVELOPMENT
AS AN OIL & GAS RESERVOIR
'A' PRIOR TO ROCKY MTN. UPLIFT Strata gently inclined eastward
FOOTHILLS AREA
WESTERN ALBERTA PLAINS AREA
Shale and Sand
Conglomeratic Sand
Impure Sand
Clean wave washed Sand
Non-porous Sands & Silts
'B' POST ROCKY MTN. UPLIFT Strata inclined westward
Productive Oil and or Gas Trap
J.C. SPROULE & ASSOCIATES, CALGARY

the block quite thoroughly, no drilling has been done on the Texaco block and apparently none is scheduled for the near future.

It is well known that some 30 seismograph parties were engaged in shooting this entire region for a month before the date of the Government sale. Records are all secret, but it is believed that results were encouraging enough to justify the high bids. Unfortunately this territory does not always give dependable results for interpretation, and it is likely that indicated structures on the seismograph records were not in conformity with actual conditions in the subsurface. This would be borne out by Dr. Harding's remarks about lensing and permeability variations in the Cardium sand.

A short time after the sale, results of the three Stanolind wells were released, but they were far from encouraging. Stanolind Cynthia Crown Dl, lsd 8-36-48-10W5, half a mile south of the southeast corner of the Texaco block, was completed at total depth of 6,695 feet (3,510 feet subsea), set 7-inch production casing to 5,736 feet and was plugged back to 5,678 feet. This well found 20 feet of net pay zone, topped at 5,627 feet (2,442 feet subsea), and was perforated in the interval 5,627-5,670 feet with four shots per foot. It is a producer from the Cardium sand, rating initial potential of 240 b/d on production tests following fracturing. Gravity is 35° API.

Stanolind Cynthia Crown Cl, lsd 2-6-50-9W5, was taken to total depth of 6,365 feet and plugged back to set production casing at 5,442 feet. It found only six feet of total oil saturation in the Cardium sand, topped at 5,332 feet (2,249 feet subsea), and rated 82 b/d on flow through a 16/64-inch choke on production test. This well is seven miles north and slightly east of the Dl well, half a mile east of the center of the east boundary of the Texaco block.

The third Stanolind wildcat, Stanolind East Cynthia Crown Al, lsd 16-30-51-9W5, topped the Cardium sand at 4,755 feet (1,920 feet subsea) but found only a few thin stringers of tight sand with no oil staining or oil shows. It is 11 miles north of the Cl well and nearly a mile east of the center of the east boundary of the Imperial block. In the course of drilling deeper, it found a good showing in the Mississippian limestone formation, topped at 6,587 feet (3,752 feet subsea), was completed at total depth 6,654 feet (3,819 feet subsea) and perforated in the Mississippian interval 6,608-6,612 feet after establishing 10 feet of net porous pay zone in this formation. The discovery drill-stem test of interval 6,587-6,612 feet recovered natural gas in three minutes at maximum rate of two mmcf/day and oil in 15 minutes, with 360 feet pipe recovery of 35° API gravity. On a 24-hour production test, the well rated initial potential of 115 b/d through a 16/64-inch choke.

The ostensible conclusion to be drawn from these three completions is that there is a strong probability of the Cardium sand's productive area running out to the northwest for some distance, although it develops a further productive region around the Shell Peers success farther northwest. The Imperial block appears to be in an unproductive sector. This is at least partially confirmed by the abandonment of three of its six wildcats. Imperial Cynthia (Northville) 15-2-52-10, lsd 15-2-52-10W5, three miles northwest of the Stanolind Al Mississippian success, was abandoned at total depth of 7,130 feet (ground and KB elevations not stated) after failing to find any encouragement in either the Cardium or the Mississippian formation.

Imperial Bigoray (Cynthia) 2-17-51-10, lsd 2-17-51-10W5, was drilled six miles southwest of the Northville well and six miles southwest of the Stanolind Al well. It was abandoned at total depth of 7,670 feet (4,611 feet subsea) with no production indications in any formation.

Imperial Cynthia 14-28-52-11, lsd 14-28-52-11W5, was abandoned at total depth of 7,412 feet (4,486 feet subsea), near the northwest corner of the exploration block, nine miles northwest of the Northville well. Like the others, this well showed no encouragement sufficient to set production casing. Imperial so far has re-

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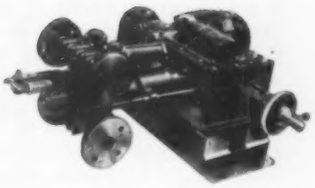

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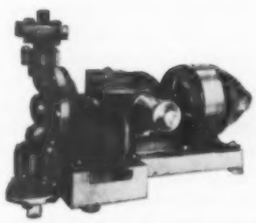
DIAPHRAGM PUMPS for circulating GASES at moderate differentials are constructed for pressures up to 1,000 lb. per square inch, and in single, double and treble stage units for dealing with rare gases under high vacuum and delivering under pressure to gas analysis equipment.



Standard G/250 diaphragm pump with micro-variable control.

PLUNGER PUMPS as single units with ram diameters of from $\frac{3}{16}$-in. dia. to 4-in. dia. and capacities of from 5 ml. to 500 gallons per hour and pressures up to 20,000 lb. per square inch.
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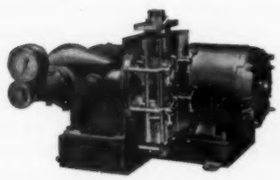

Diaphragm pump micro-capacity control with dial-type stroke adjustment indicator.

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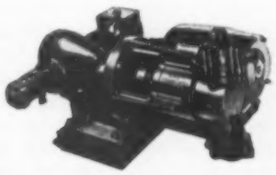
MULTIPLE pump sets of up to eight pumps, driven by one motor for a complete process, each pump fitted with independent capacity control and the volume of the mixture can be varied whilst maintaining the blend by the use of a variable-speed motor which can be automatically controlled if required.



Standard G/250 plunger pump Low-pressure type with micro-control.

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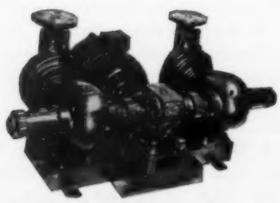
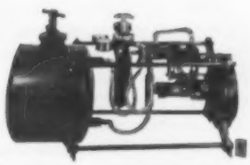
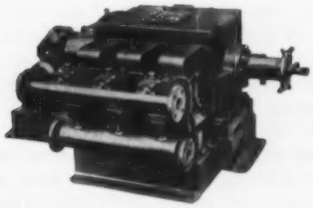


Twin G/250 diaphragm pumps. Can be supplied in multiple units of eight or ten pumps.



Pneumatic chemical feeder driven by natural gas or compressed air.



Treble plunger pump with micro-variable volume control. High volumetric efficiency straight-line variable capacity.

leased no information about formations encountered, or formation tops.

The other three Imperial wells are still drilling, at various depths. Imperial South Cynthia 13-5-51-11, lsd 13-5-51-11W5, was last reported at the end of September waiting on road conditions to resume drilling at 7,394 feet. This well is in the extreme southwestern corner of the block. Imperial Cynthia 3-1-52-11, lsd 3-1-52-11W5, in the center of the block, was testing at total depth 10,311 feet. Imperial Cynthia 9-6-52-11, lsd 9-6-52-11W5, at the center of the west edge of the block, was swabbing at total depth 10,217 feet. No hint of any engagement in the form of indicated commercial production from either the Cardium sand or the Mississippian limestone was given by Imperial, and it is generally assumed by the industry that the last two wells are unlikely to produce oil.

The field, as defined by Conservation Board order No. 158F, dated August 20, 1954, covers two areas which enclose approximately the lease blocks selected by the Socony-Vacuum team out of its original exploration permit and their immediate extension areas. Nineteen sections or 152 wellsites are contained in the northeasterly block and 41½ sections or 332 wellsites in the southerly block. Most of the active drilling so far has been done in the southerly block, around the discovery well, and in the Wolf Creek extension area to the south which is now included in the field boundaries. The boundaries are admittedly arbitrary and are subject to the probability of frequent revision as weather conditions permit resumption of drilling on a larger scale. This will probably not occur now until the winter.

On account of the small amount of development, no additional reservoir information was presented to the June hearing on maximum permissive rates of production, beyond what had been compiled for the hearing in February. This showed that average field net productive thickness of pay zone is 32 feet, with average porosity 15 percent over this thickness. The sand exhibits variations of porosity and permeability throughout the oil-bearing section and no positive method has been established of deriving a final figure of productive porosity footage.

Total thickness of the productive zone, including the sand and the shaly sand, has been found as great as 70 feet. Initial flowing production tests have given a maximum of 630 b/d of clean oil on ⅜-inch choke. The sections within the productive zone have been found to comprise: a porous and permeable conglomerate; a well developed, clean, finely grained, unconsolidated quartzose sand; and a shaly, silty sandstone of variable permeability and porosity. Cores have been taken through the entire zone in most of the wells drilled to date, so that information is complete as far as the extent of development goes. Connate water is assumed to be 30 percent average, although no water has been produced either on drillstem test or production of any well. The figure is assumed by comparison with known Viking sand pools.

Oil analysis shows 35.2° API gravity, specific gravity 0.849, sulfur content 0.23 percent by weight, and Saybolt Universal viscosity 75 sec. at 70°F. and 44 sec. at 100°F. Shrinkage factor of 0.82 calculated has been confirmed in measurements made on a bottom hole sample taken on drill stem test. Initial reservoir pressure was 2,630 psig at datum, 2,100 feet subsea, some 350 psi above normal hydrostatic pressure. Estimated recovery of 20 percent of oil in place is calculated over a ten-year period, by primary recovery. Current MPR, valid until October 31, is 200 b/d per well.

Among the extended regions of indicated Cardium sand saturation is the area to the southeast and east of the first discovery block. The longest extension in this direction was scored by the Baysel-Great Plains-Seaboard-West Buck Lake 14-21 wildcat, lsd 14-21-46-7W5, which was completed in March and set production casing at total depth 5,333 feet (2,378 feet subsea), after topping the Cardium sand at 5,223 feet and securing a flow rate of 528 b/d on drillstem test of interval 5,240-55 feet. This well is eight miles southeast of the southerly sector of the first discovery block. The minimum boundaries of saturation extend ten miles north, seven miles east and ten miles west of the discovery well.

Of considerable interest as well as the Cardium sand extensions is another discovery well still farther east which made a dual-zone strike in Cardium sand and the higher Belly River sand. This well, Imperial-Canadian Superior Buck Creek 14-29, lsd 14-29-48-6W5, drillstem tested the Basal Belly River sand last December and got a pipe recovery of 930 feet of 38 gravity oil from the interval 3,580-3,605 feet (770-795 feet subsea). A thin pay zone of five to 10 feet was indicated. In the Cardium sand, topped at 4,634 feet (1,824 feet subsea), 37 gravity oil was yielded on drillstem test. The site is 12 miles northeast of the original discovery well.

In the area southeast of the main Cardium accumulation a discovery of Viking sand 37 gravity oil was made in December 1953 in the Canadian Delhi-Great Plains et al Minnehik 11-33 wildcat, lsd 11-33-46-6W5, and after drilling to total depth 6,825 feet (3,892 feet subsea) was perforated in the intervals 5,921-31 feet and 5,908-13 feet. Initial potential rates of 550 and 845 b/d were established from the respective intervals. Viking sand top was estimated at 5,900 feet (2,967 feet subsea).

If weather conditions had been anything approaching what has been considered normal for many years past, active development of all these extension and new zone discovery areas would undoubtedly have taken place by this time. The cumulative effect of the additional Viking sand, Mississippian limestone and Belly River sand objectives will stimulate considerable further exploratory drilling as soon as ground conditions permit, particularly in the case of any wells in extension areas where the Cardium sand may be missing. The picture at present is one of a vast exploratory drilling area which will be extremely rewarding in the form of reserves of oil in the ground.

Not quite so attractive is the impact which development of this region will have on the general marketing of crude oil from Alberta, now suffering from restrictions imposed by geography and reflected in progressively reduced allowables for all fields above their economic allowable. Completion of the Pembina Pipe Line Co. 16-inch crude oil pipe line from the field to Edmonton, scheduled for November, will bring relief to the owners of existing wells by giving them a transportation medium not affected by weather, and will introduce Pembina crude into the national marketing channels in much larger quantity. The line is designed for ultimate capacity of 150,000 b/d, no more than the full economic allowable for 3,500 wells at present set minimum production rate of 42 b/d. It is fair to say that disposing of Pembina crude at its maximum possible production rate will be a major challenge to the producers.

How optimistic some interests in the industry are about this long-term prospect can be judged from the contract recently concluded between Canadian Petrofina Ltd. and Great Plains Development Co. of Canada Ltd., by which Great Plains turns over to Fina for development its entire holding of some 17,000 acres (more than 200 wellsites) in the region southeast of the Socony discovery block. The terms require no cash outlay except the drilling commitment and repayment of capital already spent by Great Plains. In return Fina secures an unspecified interest in production. This particular contract is believed to be part of the plans which Fina has for securing crude production up to at least the capacity of its refinery presently under construction in Montreal. Its 20,000 b/d will be supplied from the Middle East or South America, but acquisition of extensive production in Western Canada would give Fina a bargaining position in the international crude markets in relation to purchase of its Montreal requirements.

In general terms, however, the Alberta Conservation Board has made it clear to all operators that Pembina crude will be governed by the allowables formula which applies to all Alberta fields, so that any private contracts are subject to this over-riding authority. This control is accepted as part of the problem of securing orderly marketing of crude oil throughout the province and in the long run it will prove beneficial in the Pembina development.

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S/1244

Petroleum's Stake

(Continued from page 57)

or about 35 cents out of every highway tax dollar collected there since 1933.

Figures compiled by the United States Bureau of Public Roads show that New York's diversion of highway funds, dollar-wise, have run as high as $77½ million in a single year, and percentage-wise have exceeded 58 percent of the year's total highway revenue on three occasions. Needless to say, all that money could have built hundreds of miles of highway. Even in terms of superhighways, New York's diverted funds over the years add up to a figure comparable to the total cost of the new 432-mile New York State Thruway.

New Jersey, the state which gained distinction in 1891 as the first to provide state funds for roads, is better known today for the practice of draining vast sums of money out of its highway revenue. The $238 million which New Jersey has diverted over a period of 27 years is equivalent to about 40 cents of every gasoline tax dollar collected by the state during that period. The sum would have been sufficient to pay the full cost of the New Jersey Turnpike and without any need for future tolls.

This year, with highway taxes already amounting to 48 percent of total state revenue, or nearly twice the national average, the New Jersey legislature further added to the woes of the highway users by saddling them with a $14 million increase in the gasoline tax, but not for highways. This increase was levied specifically for a non-highway purpose, i.e., state aid to school districts.

Delaware and Rhode Island are two other states which have seen fit to mix their highway tax dollars into the general fund, letting their highway departments get what little they can from the state treasury. Being the two smallest states in size, their diversion figures, dollar-wise, are not as impressive as those of New York and New Jersey, but percentage-wise they top all the rest.

Rhode Island, from 1933 through 1952, diverted over $68 million, or more than 46 percent of all highway tax revenue collected during that period. In some years the diversion amounted to over 60 percent of total highway revenue, but in 1952 the $4.8 million diverted represented only 39 percent.

It was then that Delaware nosed Rhode Island out of first place for the doubtful honor of being, percentage-wise, the worst practitioner of diversion in the nation. The $3.2 million Delaware diverted in 1952, though less in amount than Rhode Island's diversion, represented 42 percent of the state's total highway tax revenue.

The more than $15 million which Delaware has diverted since 1935 would go far toward relieving the present-day highway problems of that state. It's about as much as Delaware now collects from all highway taxes over a two-year period.

To look at the brighter side of the picture, it is encouraging to note that these four states are the notable exceptions and not the rule. Most states have come to realize that highway fund diversion is as unsound financially as it is morally unjust. The wise public official knows that an adequate system of roads is to be counted among a state's most valuable economic assets, and that the proper time to build such a highway system is year by year, as funds are available, and not all at one time, after the situation has become acute.

Several states, notably Mississippi, North Dakota and South Dakota, having abandoned diversion, have already made some progress toward repaying to their highway departments the sums diverted in past years. Indiana also is now seriously considering such a plan.

If all states were to adopt this policy of reimbursing their highway funds for all diversions since 1924, the highway systems of the nation would benefit to the tune of nearly $4 billion. That is the sum that this form of "highway robbery" has taken out of the states' road programs over that period of years.

While the principle of "high taxes for highway financing" has been the basic though sometimes forgotten philosophy behind all state taxes on gasoline and motor vehicles, it has not been the rule with regard to the federal gasoline tax, and there is reason to hope that it never will be.

The federal gasoline tax was first imposed in 1932 at a rate of one cent per gallon as a special emergency revenue measure to help balance the federal budget during the depression. It was so temporary in nature that it had to be reenacted every two years, and it always was. The rate was increased to 1½ cents in 1940 to meet the national defense emergency and to two cents in 1951 for the Korean crisis.

Unlike state gasoline taxes, which apply only to motor fuel used on the highways, the federal gasoline tax applies to all gasoline, but the cost of this tax to the nation's highway users alone now amounts to about $850 million a year, and since 1932 has cost them more than $8 billion.

In recent years, there has been a growing tendency in certain quarters to attempt to link the federal gasoline tax with the federal highway aid program, the roots of which go far deeper in history.

The suggestion, expressed or implied, is that if the federal gasoline tax is repealed, it will mean an end of all federal highway aid and of all the research and coordinating activities carried on by the United States Bureau of Public Roads. A logical question is: Why should it?

Actually the idea of federal aid to highway construction predated by many years the time when a gasoline tax or even gasoline itself was dreamed of. The building of the National Pike in 1806 from Cumberland, Md., to Wheeling, W. Va., and later to Illinois, was a noteworthy federal project of early times.

The Bureau of Public Roads, under several different names, goes back to 1893, when Congress created the Office of Road Industry in the Department of Agriculture, and launched a program of building "object lesson" roads throughout the country. The present full-scale program of providing federal-aid money to the states for road construction began in 1916, fully 16 years before the first federal gasoline tax was enacted.

The Bureau has performed great service in many directions. It has encouraged the development of standardized highway programs in the various states. It has coordinated and materially supported the development of interstate highways. Its policies in past years have done much to curb the diversion practice by threatened withholding of federal aid from diverting states. Its activities have been extremely beneficial in encouraging the development of the great American highway system of today.

But in that word "interstate" there is inherent danger, for just as the word has been construed in the field of labor relations to connect a city bus driver or even the corner newsboy with interstate commerce, so it may be that one day it will put under the thumb of Washington every city street or country lane in the United States. Such is not beyond the realm of possibility.

Those who feel that most of America's highways can best be administered at state level are not elated at the prospect of bigger and bigger annual federal grants which may, on one hand, spell centralization and, on the other, provide a weak but acceptable justification for perpetuating a tax burden upon the motorist which far outweighs the benefits received.

Year after year, state legislatures have been adopting resolutions urging Congress to repeal the federal gasoline tax. Also, it has become almost standard procedure for state governors, at their councils, to take formal action condemning the federal tax.

With the change of administration in 1953, there were strong indications that the federal gasoline tax might at last be repealed, not only as one of the overlapping taxes duplicated at several levels of government, but also as part of the apparent trend away from centralized big government in Washington and toward reduced federal taxing and spending.

As long as the nation was engaged in war in Korea, it was understandable that repeal of the tax could hardly be expected immediately, but optimism prevailed that this would be one of the first federal taxes to go.

(Continued on page 104)

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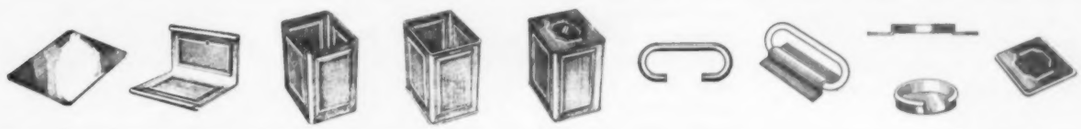

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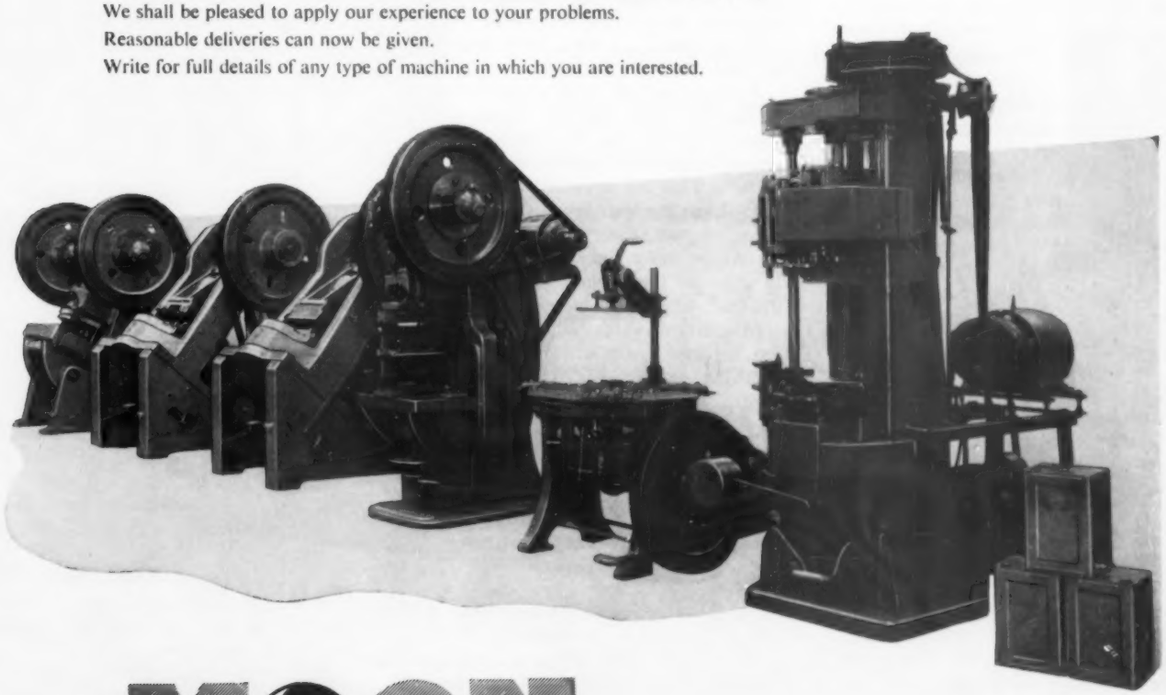

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But with the second session of the 83rd Congress, this hope began to fade. Some reductions in federal taxes were made this year, including the income tax. Even the excise taxes on jewelry, furs, perfumes, theater tickets and travel were cut down to 10 percent, but nothing was done to lighten the higher-than-luxury tax on gasoline for the family car.

Now a person can fly to Miami, take a Mediterranean cruise or ride the Super-Chief to California with only a 10 percent tax on his ticket, but when he goes to buy gasoline for the family car, he must still pay a 35 percent or perhaps a 45 percent tax on every gallon.

Not only was the federal gasoline tax continued, but in Congress a concerted effort was made this year for the first time to link this tax legislatively with the new and increased highway aid program. The federal aid bill, as passed originally by the House, actually contained a direct reference to the gasoline tax, although the clause was later deleted by the Senate before final passage.

This new federal highway aid measure, which had the full support of the oil industry, provided a record sum of $966 million annually for fiscal years 1956 and 1957. While these increased federal funds will certainly be of great help to many states in overcoming highway problems, ironically enough, for some other states they may create some new problems of financing.

Federal aid bills have been enacted year after year, authorizing funds to be matched dollar-for-dollar for specified types of highway improvement. Under the limitations, many states have not been able to utilize fully all federal monies authorized to them in the past without curtailing their efforts on other important projects. Total accumulation of such unclaimed funds amounted this year to $2.7 billion.

Now, with federal aid offered in larger amounts, and with the same matching ratios as before, an effect of this new measure may be to create widespread agitation for increased state taxes, and for no other purpose than to provide matching money with which to claim federal funds. This, of course, could lead to "forced spending" of a very dangerous type.

On the other hand, a factor which has delayed some states in taking full advantage of available federal funds has been a shortage of highway engineers to develop the necessary plans for federal aid projects. With this problem gradually being overcome and with the backlog of unclaimed funds still available to the state, the situation can be noted as further evidence of the roadbuilding boom in prospect for the years immediately ahead.

Road-building enthusiasts here in America would have us believe that little or nothing has been done in recent years to meet the traffic problems of the present day.

Actually, a great deal has been done, and the fact that there are still bottlenecks and congested areas needing attention does not mean that America's spectacular and well-established system of highways is suffering anything more than normal growing pains.

During the seven years from 1945 through 1952 more than 307,000 miles of surfaced highway have been built by the state highway departments throughout the nation, and that does not take into account the hundreds of additional miles of toll road that have been and are being built to meet pressing traffic conditions.

As already noted, the larger proportion of the vast sums the states are collecting from highway users is going to its intended use in highway construction and maintenance. It has been conservatively estimated that under present taxes and with federal aid continued at a reasonable level, the states should have approximately $50 billion to spend on highways over the next ten years.

For several years following the end of World War II, material and equipment shortages and continuing high costs were factors retarding the full scale highway development contemplated by the states. The Korean war then brought another set-back. Only now are some of these state programs getting into high gear, but the direction is forward.

A recent survey of 38 states conducted by the National Highway Users Conference revealed that for the group as a whole, highway construction expenditures in 1956 are expected to run 67 percent above the 1952 level. Of these states, seven expect their increased spending to rise by more than 100 percent, while 14 estimate their increases at somewhere between 50 and 100 percent.

In addition to state highways, toll roads are another type of facility not to be overlooked. Such roads, by their very nature, are being built in localities where traffic congestion is most acute and so can be expected to relieve the traffic load of the regular highways they parallel.

Total mileage of toll roads actually in operation has increased from 240 miles, as of five years ago, to approximately 1,000 miles today. Looking to the future, 1,120 more miles now actually under construction may be added, plus 4,700 miles specifically authorized, plus still another 5,300 miles being seriously considered. Even if only half of the projects in this latter category actually materialize, it is estimated that about $10 billion will be spent on toll road construction during the next ten years.

Certainly it is true that there has been a great increase in highway travel during the postwar period, and the fact that there are so many more cars on the roads is a main reason why highway taxes today yield so much more revenue than in previous years.

When present and future traffic estimates are cited as justification for higher rates of taxation on highway users, much emphasis is placed on the number of new cars produced. When we are reminded of the 32 million automobiles and seven million trucks manufactured and sold in this country since 1945, we are left with the impression that all this is net increase.

Such calculations must not assume that "old vehicles never die," for in reality they do. Much of this production, of course, has gone into replacement of older cars and trucks which have since been scrapped or otherwise retired from the highways.

With all this remarkable production of new cars that has been witnessed in recent years, it is interesting to note that the total registration of all private and commercial automobiles, buses and trucks in the United States by the end of 1953 was 55,592,664, a figure only 61 percent higher than the 1941 total.

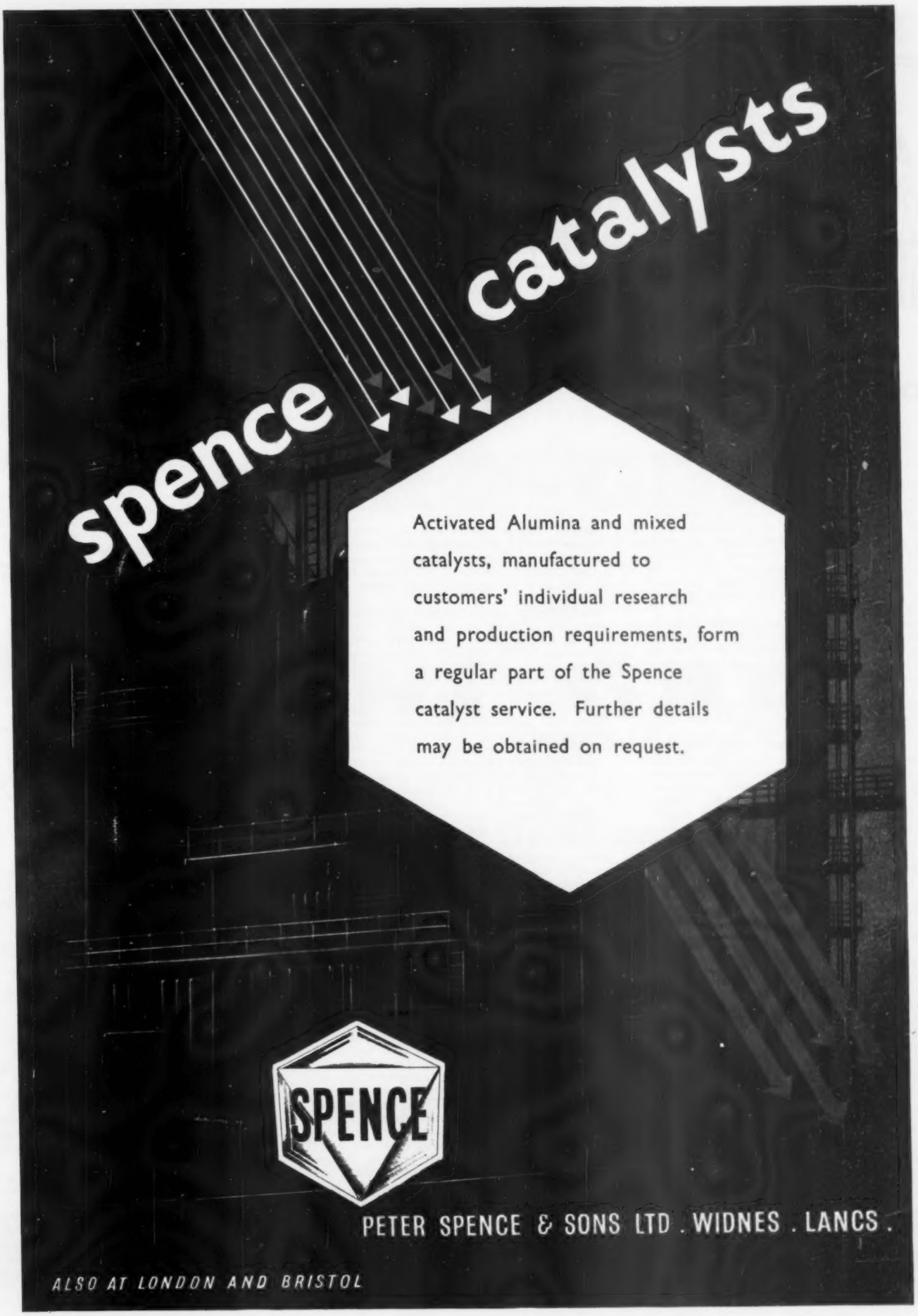
These 55½ million vehicles include 43 million privately-owned passenger cars, or one for every 3.4 men, women or children of the civilian population. In 14 states, the private car ratio runs as high as one car for less than three people. which would seem to be coming pretty close to the saturation point. Undoubtedly vehicle registrations will continue to increase, but not as sharply as in the years immediately following the war. The trend seems to be leveling off, as any car dealer will attest, and perhaps taxes have played a part in this.

National defense is a factor often mentioned in connection with proposed highway programs. Certainly it is true that highways are a vital link in the defense chain, and fortunately they are something in which the United States takes second place to no other nation.

The nation's 3.3 million miles of highways and city streets are equal to more than half the combined road and street mileage of the entire rest of the world, and in terms of quality and engineering, there is no comparison. The two million miles of paved roads and streets would extend nearly ten times the distance to the moon or would encircle the earth 80 times at the equator.

Russia is the only other country having more than a million miles of streets and roads, yet in all of Russia there are fewer miles of surfaced roads than are to be found in the single state of Florida. Russia's total mileage, paved and unpaved, does not come within 300,000 miles of America's paved mileage.

All this, of course, does not mean that the highways of America need no improvement. They do, and by and large they are being improved rapidly and to a remarkable degree. America's highway system is something upon which the nation can build for the future. It is not something to be discarded and replaced.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Washington PIPE LINE

Conflict on offshore boundaries continues

By Joseph B. Huttlinger

While the 83rd Congress settled the ownership of offshore submerged lands in a general way, in two pieces of legislation it left some phases of the subject still to be determined.

The chief of these is the answer to the question of exactly where the boundary is between the inner belt of the submerged lands, or the state area, and the outer belt, which is placed under the jurisdiction of the federal government by the legislation.

Settlement of this question involves a determination of what is meant by "territorial waters," as the so-called tidelands act gives the states title out to the limit of these waters. The federal government has control beyond that limit.

At the time when the legislation was passed, there was a general feeling that the boundary was 10½ miles from the shore in the case of Texas, and three miles in the case of Louisiana and most of the other states. Like Texas, Florida had a claim to a 10½ mile limit, too, both states basing their cases on the special conditions under which they entered the Union. These are the figures that have been generally quoted in discussions of the subject.

Recently, however, federal officials have indicated that three miles is the limit for all states and that if some of them insist on claiming areas further out, they will have to take their claims to the courts. President Eisenhower indicated a short time ago he disagreed with this view, as did Secretary of the Interior McKay, but immediately after the President spoke, Herman Phleger, the legal adviser to the Department of State held out in a public address for the three mile limit.

Whichever side of the controversy prevails, the necessity of establishing the dividing line between the two areas will remain, and there are many who foresee a new dispute coming to a head, once the November elections are out of the way, to settle what is meant by "traditional boundaries."

Pipe Line Expansion

A total of 6,977 miles of major oil product pipe lines will be completed during 1954 and 1955, according to a tabulation by the Committee for Pipe Line Companies. The estimated cost comes to $345 million. In addition, a number of smaller oil product pipe lines are being completed.

As for crude oil lines, a total of 6,270 miles of line, costing $364 million, is down for completion in the two years. Again, the list is not complete, being confined to the bigger lines. As time goes on, more projects are being added to the expansion of the nation's oil pipe lines system, just as some of the projects listed as due for completion may not actually be constructed within the time indicated.

Gas Producers Win Reprieve

Natural gas producers who are independent of long distance transmission lines are already feeling the pinch of the new controls over their prices and sales, although the definite deadline for the start of controls now shapes up as December 1.

On that date, each of some 4,100 independent producers, who up to the present have been free of federal control over their prices and the volume of gas they may sell, must file with the Federal Power Commission details of their rates and volume of gas sold.

The FPC will then decide whether or not to approve each rate, and the volume of gas sold. After that, application must be made to the FPC for any changes in rates, and in volumes of gas sold to the long distance lines.

The December 1 deadline was in the nature of a reprieve for independent gas producers, who protested the FPC's earlier deadline of October 1, and challenged the validity of the FPC method of taking control by Order 174-A. As a result, the FPC held a two day hearing where scores of attorneys representing the whole independent gas producing segment appeared before the FPC. The major result was the two month extension of time for producers to file, although some changes in the FPC method of taking control are expected.

As the new controls start, in response to a decision of the U. S. Supreme Court on June 7, 1954, the controversy is most heated over two types of activity engaged in by independent producers.

One question has to do with the escalator clause, under which the pipe line or other buyer of gas arranges to pay a higher price for the gas year after year by an automatic increase written into the contract. The FPC has given clear notice that it disapproves of such contracts and will demand the right to approve any increases in gas prices whether based on escalator clauses or not. Meanwhile, on November 4, the FPC scheduled a major hearing on the whole subject of the escalator clauses and how to handle them in the simplest manner.

A second phase of activity stirring controversy lies in the "escape clauses" written into many contracts, under which a producer may tear up his contract in the event the FPC actually takes control over prices and sales of gas by the independent producers. Already 14 producers have moved to trigger off such clauses in contracts with Texas Illinois Natural Gas Pipeline Co., Chicago, and others are following suit. The escape clause is playing a major role in the case of at least one new project, the proposal of American Louisiana Pipe Line Co. for a $130 million gas line to Detroit, which has an FPC certificate on condition that the independent producers who supply the gas will file with FPC. A number of escape clauses are in contracts between American Louisiana and producers and the chance of a court fight to test their validity is in prospect.

Beyond these two centers of conflict, there are a dozen points where the new controls, still taking form, pinch both the producers of gas and the pipe line companies. As time goes on, resort to the courts may be had to settle some of them. At the same time, the FPC faces a test of its wisdom and reasonableness in exercising its new-found powers.

In the long run, however, the whole issue is sure to be laid before the Congress, which returns to its business sessions in January, for a settlement once and for all. On the day when Congress opens, a number of bills are expected to be introduced asserting that the FPC is to keep its hands off prices and sales of gas by independent producers. Whether legislation of this sort can muster enough votes for enactment into law may not be known until months later.

Gasoline Can't Supply Doubled Road Program

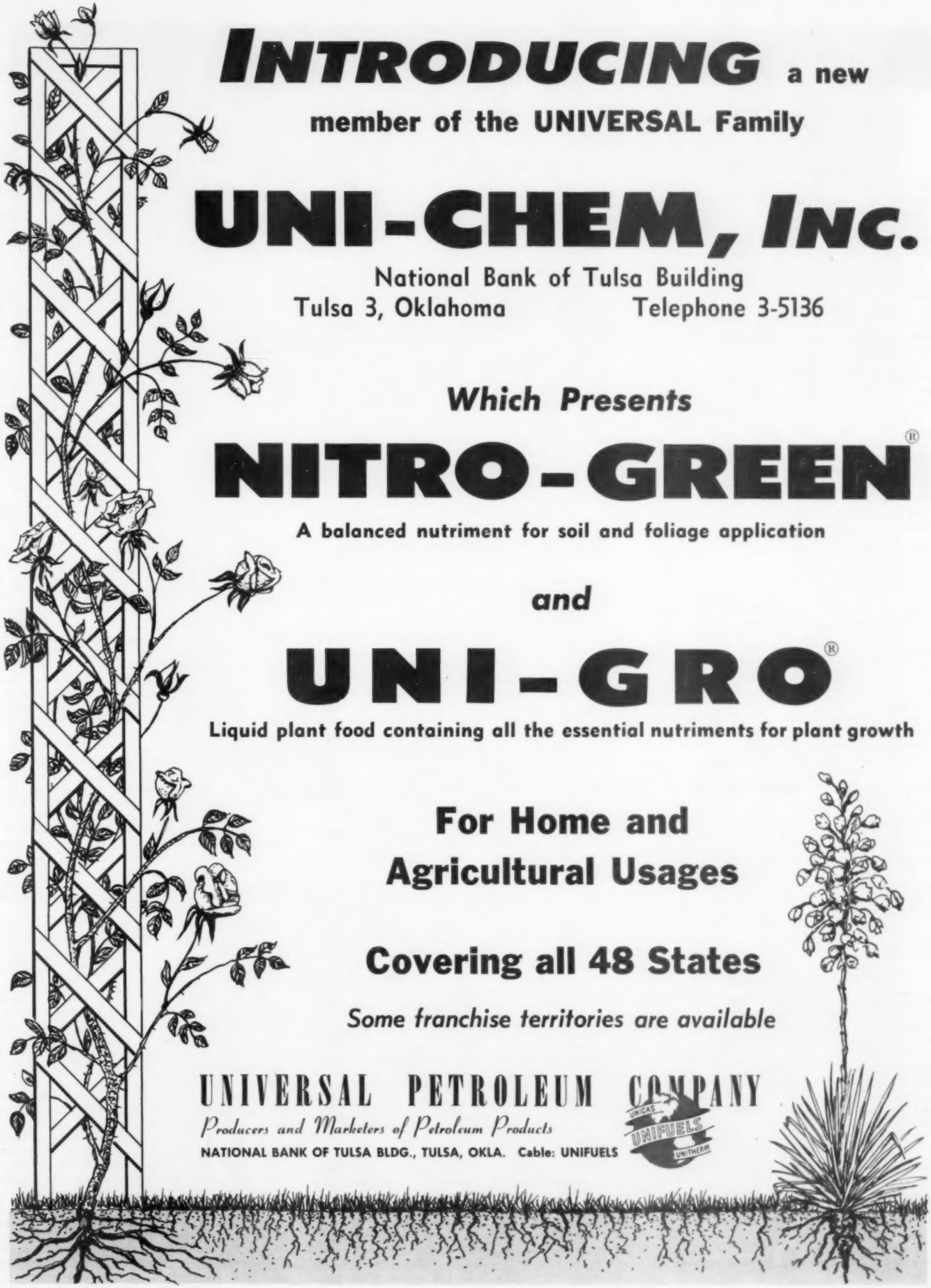
In a preliminary hearing during the first week of October, the President's advisory committee on a national highway program, of which Gen. Lucius D. Clay is chairman, listened to the views of a number of national organizations as to the best means of implementing the program.

The views of the petroleum industry were presented by Joseph P. Walsh, general counsel of the Sinclair Oil Corp. and chairman of the American Petroleum Industries Committee. Estimating the sum available for road improvement under present provisions at about $50 billion annually, he warned that higher gasoline taxes could not be relied upon for doubling this amount.

"The combined level of federal and state taxes on gasoline is now excessive, discriminatory and unreasonably oppressive," he said. "The average state and federal taxes levied on gasoline now amount to at least 7.5 cents per gallon. This is 60 percent of the manufactured price.

"It is manifestly unfair to expect the principal product of our industry to bear such a heavy burden of taxation.'"

Mr. Walsh pointed toward evidence that a large part of the 40,000 miles of the interstate highway system may be turned into limited access highways. If this is carried out, he said, it could affect "adversely" thousands of service stations, perhaps as many as 40,000 out of the total of 400,000 in the country.



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CANADA

Enlarges Sulfur Plant

The extensions of Shell of Canada's natural gas and sulfur plant at Jumping Pound, Alberta, will soon be producing additional fuel for Southern Alberta and sulfur for an important uranium property in the Lake Athabaska area. Refinery Engineering Ltd., gas plant contractors, and R. M. Parsons Co. of Canada Ltd. expect to complete the multi-million dollar additions by late fall.

The expansion of the gas plant follows the conclusion of contracts calling for greatly increased deliveries to the Canadian Western Natural Gas Co. which supplies Calgary, Banff, and other Southern Alberta communities. The capacity of Shell's Jumping Pound plant will be raised from 35 to 60 million cubic feet of sales gas daily.

As a result of this increased production, Shell is raising the capacity of its sulfur plant from 30 to 80 tons per day.

Present sulfur production is sold to the paper industry in British Columbia on the Pacific Coast. Additional production will be purchased by Gunnar Mines Ltd. for conversion to sulfuric acid for the treatment of uranium ore at Lake Athabaska.

Electrify Saskatchewan Fields

Expenditures totalling $250,000 will be made for transmission and distribution lines for the electrification of the Cantaur, Success and Fosterton oil fields in Saskatchewan. The project will be completed in December.

Contracts have been signed between the Saskatchewan Power Corp. and Socony-Vacuum Oil Co. of Canada Ltd. and the Sohio Oil Co., which are operating some 120 oil wells in the area. The corporation is constructing a 72,000-volt transmission line, one of the largest of its kind in Saskatchewan, to take power to the area. From this line, 24,000-volt tapoffs will be constructed to each field and each individual well will have 460-volt power available.

Farmout to Canadian Gulf Oil

Royalite Oil Co. Ltd. and Sun Oil Co. have completed a farmout to Canadian Gulf Oil Co. and Triad Oil Co. Ltd. of 1,362,359 acres of reservation lands and 963 acres of freehold leases situated in the foothills of Western Alberta. The reservation lands comprise 15 petroleum and natural gas reservations which have been held jointly by Royalite and Sun since 1952. The major portion of these reservation lands is situated in the area between the Clearwater and Athabasca Rivers. Test drilling will begin in 1955.

OIC Valves in Canada

Sheepbridge Engineering (Canada) Ltd., Guelph, Ontario, has been licensed to manufacture cast steel industrial valves for The Ohio Injector Co. of Wadsworth, Ohio, according to an announcement by Harry G. Smith, administrative vice president of the Ohio firm. Valves will be marketed in Canada through authorized OIC distributors located in strategic positions to provide customers with a full range of services.

New Royalite Offices

Royalite Oil Co. will build a new office building in Calgary to house company headquarters. The six-story building is to be erected on a 200 x 130-foot site at Seventh Ave. and Second St., West. It will be built with provisions for adding an additional six floors. Parking space is to be provided for 70 cars. Work is to begun at once with completion scheduled within 18 months.

Co-op Refinery Enlarged

An enlarged and modernized refinery centered around a new UOP fluid catalytic cracking unit went into operation recently at the plant of the Consumers Cooperative Refineries Ltd. at Regina, Sask.

Construction of the 4,500 b/d cat cracker, a UOP polymerization unit, a vacuum unit and a gas recovery system, in addition to the conversion of a thermal cracker to a crude unit, completed a multi-million dollar expansion and modernization program which has resulted in substantially increasing the crude capacity and the overall gasoline yield of this, the oldest co-operative refinery in the world.

Saskatchewan Securities Act

A revised act known as The Securities Act, 1954, chapter 89 of the Statutes of Saskatchewan, 1954, became effective Sept. 1. The act provides for the establishment of a three-member Saskatchewan Securities Commission and requires the filing of prospectuses before securities may be offered for sale.

Royalite Oil Buys Properties of Hi-Way Refineries Ltd.

Royalite Oil Co. Ltd. of Calgary has acquired the properties, Saskatoon refinery and marketing facilities of Hi-Way Refineries Ltd., well-known Saskatchewan oil company. Under terms of the purchase, Royalite now owns all of the stock of Hi-Way Refineries Ltd. and its subsidiary, Alberta Hi-Way Refineries Ltd., together with Hi-Way's 80 percent stock interest in Saskatoon Pipe Line Co. The Hi-Way organization now becomes a wholly-owned subsidiary of Royalite and in future will operate under the name Royalite Hi-Way Limited. Head office of the company will remain at Regina.

Hi-Way Refineries incorporated in Regina in 1931 and operates a modern 6,500 b/d refinery at Saskatoon, which includes a catalytic cracking unit. Products from this refinery, together with lubricating oils and greases, are marketed in Saskatchewan through a network of 11 distributors, 83 agents and 123 dealer outlets. In Alberta an additional nine agents and seven dealers serve the Edmonton area.

With the addition of the Saskatoon refinery, Royalite now has plants in the three Western provinces. The company already is operating refineries at Prince Albert and Coleville, Saskatchewan and at Kamloops, B.C. Gasoline absorption, propane and sulfur plants have been in operation in Turner Valley for some time.

No change in the present management setup of Hi-Way or its personnel will be made, according to Ray Althouse, executive vice-president of Royalite. It is planned that Hi-Way will shortly engage in the search for oil in Western Canada on its own account and will develop prospective oil and gas properties that it may acquire.

Plans are being discussed now for standardizing identification of Royalite and Hi-Way service stations and the trade mark designs of the two companies will shortly be replaced by a single new emblem.

Until recently Royalite has been engaged principally in the production, purchase and sale of crude oil, absorption gasoline and natural gas and in the exploration and development of prospective oil and gas lands.

The company was incorporated in 1921 and pioneered the development of the Turner Valley field in Southern Alberta. In the Turner Valley field the company owns or has an interest in 77 crude oil wells and 62 gas wells. With discovery of the Leduc and Redwater fields in 1947-48, the Company expanded the scope of its operations by undertaking an aggressive program of development, exploration and acquisition of additional acreage. Its operations now extend into a widespread number of localities in Alberta, British Columbia, Saskatchewan and Manitoba.

In 1949 Royalite entered the Redwater field and in six months established a record of 20 straight producers. It now has interests in 47 producing oil wells in that field. Royalite's first major successful wildcat development was at Stony Plain, Alberta, west of Edmonton, in 1951 with a 50 percent interest in 11 producing oil wells. The same year Royalite discovered oil in what is now the Coleville field and to date 113 oil wells and eight gas wells have been drilled in that area. At present the company is operator of 250 oil wells, 70 gas wells and in addition has an interest in five oil wells and 22 gas wells operated by others.

In 1953 the company acquired a one-third interest in approximately 14,000 acres of prospective oil and gas lands in Louisiana. One well has been completed as a wet gas producer and another well is currently drilling below 12,000 feet.

In Turner Valley the company has two wholly-owned subsidiaries, Valley Pipe Line Co. Ltd. and Madison Natural Gas Co. Ltd. The former owns and operates one 6-inch and two 4-inch pipe lines each 31 miles long from Turner Valley to Calgary to supply two local refineries. The latter has 72 miles of gas gathering lines in the field and operates a gas scrubbing plant with a designed capacity of 100,000,000 cubic feet daily.

Royalite placed in operation in Turner Valley a sulfur recovery plant with a capacity of 30 long tons per day. This plant recovers raw sulfur from the hydrogen sulfide stripped from the natural gas in the scrubbing plant.

During the same year the physical assets of Western Propane Limited were purchased and has now become part of the company's plant system in Turner Valley. In 1953 this plant produced and sold in excess of 5,100,000 gallons of liquified propane.

A gasoline absorption plant is operated by Royalite in Turner Valley with a rated capacity of 36.5 billion cubic feet annually. In 1953 a total of 10 million gallons of natural gasoline, 5.1 million gallons of LPGas were produced. A sulfur unit produces 30 tons per day from H_2S.

At Coleville, Saskatchewan the company operates, under its wholly-owned subsidiary, Royalite Products Ltd., a 5,000 b/d refinery to process Coleville crude. Royalite also owns the Prince Albert Refineries Ltd. at Prince Albert, Saskatchewan.

Royalite Products Ltd. in 1953 commenced construction of a modern 5,000 b/d refinery at Kamloops in the interior of British Columbia. The crude unit went on stream in March of this year and construction of the catalytic cracking and polymerization units is scheduled for completion early in 1955.

A marketing division has been established to sell products of the Kamloops and Coleville plants. The company is building and acquiring retail outlets in the British Columbia interior and to date several service stations are in operation and bulk stations are being erected at strategic points throughout the marketing area.

Royalite general offices are at Calgary. At the present time the total personnel of the Royalite organization numbers in the neighborhood of 540 people. Officers are: Ray Althouse, executive vice president; A. C. Newton, vice president; R. D. Mercer, secretary-treasurer; and D. J. Morrison, C. A., assistant secretary.

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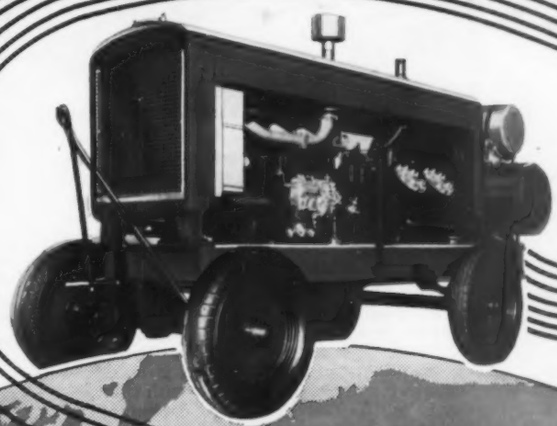

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REVIEW
of recent U.S. patents on petrochemicals

This review of United States patents continues the series on subjects of petrochemical interest. Production of aromatics from petroleum and isomerization and separation of cyclic compounds have been briefly discussed in earlier reviews, but it was felt to be desirable, in view of the importance of aromatic hydrocarbons to the chemical industry, to summarize and gather information on the subject in one review, even at the expense of having to repeat discussion of a limited number of patents. This review, just as its predecessors, makes no claim to completeness and represents a selection made by the authors on the basis of what appeared to them to be of major interest. The patent literature considered in this article covers a period of about sixteen months prior to September 1954.

By Heinz Heinemann and Felix Heinemann

The production of aromatics from petroleum has increased tremendously since the introduction of hydrogenative reforming with platinum catalysts. A large percentage of the total domestic aromatics production is now obtained by this route. Patents dealing with reforming processes have last been discussed in the annual review in the mid-year number of WORLD PETROLEUM. There are, however, patents dealing specifically with aromatics production which will be reviewed here, along with other methods of manufacture, such as synthesis, dealkylation and cracking of large molecular aromatics; methods for the recovery of aromatics from hydrocarbon mixtures will also be considered. The industrial importance of the subject is reflected in the steady increase in the number of patents issuing in the course of the last few years.

Two Sinclair Refining Co. patents deal with the conversion of high molecular weight fused ring aromatics to lower molecular weight aromatics. L. V. H. Beckberger in 2,653,176 hydrodealkylates cycle stock by passing it together with a hydrogen rich gas and steam to a catalyst comprising a major amount of iron oxide and promoting amounts of chromia and an inorganic oxygen containing sodium or potassium compound at 1200-1800°F. The same inventor, in 2,674,635, employs thermal conversion at 1300-2500°F and 0-100 psig pressure in the presence of 1-20 moles of hydrogen.

Production of aromatics by dehydrogenation of naphthenes is accomplished by L. V. H. Beckberger and R. C. Woerner (2,661,383 to Sinclair Refining Co.) by charging a C_6 petroleum cut to a molybdena-alumina catalyst at 850-1000°F., pressures up to 250 psi and hydrogen to hydrocarbon molar ratios of 2-8. Yields of benzene are greatly improved by adding 0.001-0.2 vol. percent of oxygen to the hydrogen. E. C. Corner and F. B. Fischl (2,651,597 to Standard Oil Dev. Co.) describe an improved hydroforming process which involves separate isomerization and aromatization steps. Alkyl aromatic hydrocarbons can be obtained by dehydrogenation of substituted cyclohexane hydrocarbons having no fused rings and possessing a geminal C atom, according to H. Pines and V. N. Ipatieff (2,663,746 to Universal Oil Products Co.). A platinum on charcoal catalyst and an alkyl halide promoter are employed at temperatures of 250-400°C. Socony-Vacuum Oil Co. patent 2,658,858 (W. H. Lang and C. L. Gutzeit) discloses the aromatization of hydrocarbon mixtures at 450-650°C, up to 300 psig pressure and up to 30 psig hydrogen partial pressure over iron oxide-chromium oxide catalysts which were mixed in the hydrated oxide state and under conditions to avoid chromite formation. Cr_2O_3 to Fe_2O_3 mole ratios are in the range 40:60 and 70:30.

Several patents deal with methods of separating aromatics from hydrocarbon mixtures. According to W. H. Davis (2,653,175 to Sun Oil Co.), mixtures of C_6 and C_7 naphthenes are dehydrogenated separately from C_8 naphthenes. Xylenes are recovered by distillation, while benzene and toluene are separated by adsorption. Separation of close boiling hydrocarbons can be accomplished by distillation countercurrent to a slurry of solid adsorbent in liquid reflux. (W. A. Herbst to Standard Oil Dev. Co., 2,665,315). In 2,652,437 (S. J. Marwil to Phillips Petroleum Co.), the aromaticity of a gas oil is enhanced by countercurrently contacting it with solid adsorbent at 50-120°F and superatmospheric pressure in the presence of natural gas which acts as a refluxing agent. Aromatic rich gas oil is desorbed from the adsorbent.

A method for the selective extraction of aromatic hydrocarbons from a hydrocarbon mixture is contained in RE 23,779 (J. Q. Cope and W. H. Clausen to California Research Corp.). Separation of aromatic and non-aromatic hydrocarbons by selective extraction with a fluorocarbon of specific properties and a second solvent, such as acetic anhydride, acetonitrile, aniline, benzyl alcohol, etc., is proposed in 2,663,679 (A. W. Francis and G. C. Johnson to Socony-Vacuum Oil Co.) B. Braae (2,649,467 to Separator-Nobel) contacts oil with a perfluorinated hydrocarbon having at least 3 C atoms/mole as a solvent, to produce a relatively hydrogen-poor raffinate and a hydrogen-rich extract. The extraction is carried out at a temperature at which oil and solvent are only partly miscible and in the presence of a second solvent, miscible with the oil but only partly miscible with the first solvent. Extraction with molten phthalic anhydride is suggested in 2,655, 467 (H. B. H. Cooper and E. C. Medcalf to American Cyanamid and Chemical Corp.). In countercurrent extraction, saturated hydrocarbons are obtained as overhead and a solution of phthalic anhydride in aromatics as bottom liquid.

H. V. Hess and G. B. Arnold (2,652,435 and 2,652,436 to The Texas Co.) complex polycyclic aromatics in hydrocarbon mixtures with tetrahalo phthalic anhydride and separate the complex as a solid below 150°F. The complex is then decomposed either with steam at 300-500°F or with dilute caustic solution. A method for separating aromatic and saturated non-aromatic hydrocarbons by treatment with boron trifluoride and an alkyl mono-fluoride (such as 1-fluoro-3-methyl butane) is contained in patents 2,639,260 to 2,639,262 (R. M. Kennedy and A. Schneider to Sun Oil Co.). The borontrifluoride and the alkylfluoride are brought together only in the presence of the hydrocarbon mixture. The same inventors in 2,683,757 (to Sun Oil Co.) describe a method for separating a cyclopentane from a cyclohexane by converting the former to higher boiling hydrocarbons by reaction in liquid phase in the presence of borontrifluoride and an organic fluoride.

A method for the removal of highly aromatic constituents of crude oil is proposed by A. F. Sayko and D. W. Young (2,681,301 to Standard Oil Dev. Co.). Treatment with carbon tetrachloride or tetrachloroethane at 300-600°F is followed by precipitation with a light hydrocarbon solvent containing 3 to 8 C atoms/mole.

The synthesis of cyclic olefins and diolefins is disclosed in two patents. G. M. Whitman in 2,662,102 (to E. I. du Pont de Nemours & Co.) reacts ethylene and butadiene—1, 3 in at least a 10:1 mole ratio at 100-300°C and at least 100 atm. pressure to form cyclohexene. C. B. Linn (2,678,338 to Universal Oil Products Co.) treats a mixture of cyclohexenone and a cyclohexenol at 100-200°C with an aqueous solution of an acid acting catalyst such as sulfuric acid or magnesium chloride. Cyclohexadiene is produced.

A process for the production of phenol from benzoylhydroperoxide and sulphuric acid is discussed in 2,683,751 (L. J. Filar to Hercules Powder Co.). W. C. Smith and B. Masterton (2,678,951 to Shell Dev. Co.) make 2,3,5-trimethylphenol by vapor phase reaction of methanol and 3,5-xylenol over alumina at 475-550°C in the presence of steam.

Alkylation of Cyclic Compounds

The widespread application which aryl alkyl aromatics have found in the detergent field, as well as the usefulness of these compounds as chemical intermediates for a variety of purposes, has focused some interest on alkylation as a means of producing them from benzene, toluene, etc. A fairly even stream of patents has issued in this field over the past few years, testifying to the continual attention it is receiving in the industry's laboratories.

Two recent Sun Oil Co. patents on alkylation are 2,673,224 (R. M. Kennedy and A. Schneider) and 2,668,865 (A. Schneider). The former contains a method of alkylating toluene or xylene at 40-70°C and atmospheric pressure with an isoparaffin of at least 5 C atoms and one tertiary hydrogen atom per mole. The catalyst components comprising aluminum chloride and t-butyl chloride are mixed in the presence of the hydrocarbons. Polyalkylcyclohexane is produced according to the latter patent from a substituted alkylcyclo pentane and an isoparaffin in the C_4-C_8 range. Contact is carried out at -10 to 100°C over a HF catalyst in the presence of an olefin which acts as a hydrogen acceptor. In two other Sun Oil Co. patents, (2,683,755 and 2,683,756), Kennedy

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and Schneider react an olefin and a cycloalkylfluoride to produce alkylated cyclohexanes: alkylation is in homogenous phase over borontrifluoride and in the presence of a cyclopentane and an isoparaffin. Cyclopentanes can be similarly reacted with cycloolefins in the presence of BF_3 and a cycloalkylfluoride. According to 2,681,373 (A. Schneider to Sun Oil Co.), methylcyclophexyd benzene is made from methylcyclohexane and tertiary butylbenzene by contact in liquid phase at 50-200°C with hydrogen fluoride.

F. E. Condon (2,653,980 to Phillips Petroleum Co.) concomitantly alkylates an aromatic hydrocarbon with an isoparaffin of 4-20 C atoms and an aliphatic olefin at 20-30°C over a hydrogen fluoride catalyst. One of the alkyl groups of the alkylate has skeletal structure of the isoparaffin. According to another Phillips Petroleum Co. patent (2,645,672, W. A. Schulze), high molecular weight alkyl benzenes are made by alkylation of benzene, toluene or xylene wtth a high molecular weight olefin present as a component in a product fraction from the cracking of hydrocarbons.

W. W. Johnstone (2,652,434 to Universal Oil Products Co) uses a catalyst comprising B_2O_3 $(H_3P_2O_4)_2$ for the alkylation of an aromatic with a polymeric mono-olefin of 6-18 C atoms per mole at 100-400° C. A catalyst sludge is employed by W. J. Paltz and B. R. Tegge (2,667,519 to Standard Oil Dev. Co.) to alkylate benzene or toluene with a C_{11}-C_{21} olefin. Alkylation of the side chain of aromatic hydrocarbons is possible according to 2,670,390 (H. Pines and V. N. Ipatieff to Universal Oil Products Co.) by reacting the aromatic with an olefin at 125-275° C, employing a catalyst comprising an alkali metal and an acetylenic hydrocarbon.

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Phenols may be alkylated with tertiary base olefin or with tertiary alkyl halide in the presence of phosphorous oxyhalide at 30-200° C (F. Bryner to Dow Chemical Co.). G. M. McNulty and T. Cross, Jr. (2,655,544 to Standard Oil Dev. Co.) produce high molecular weight alkyl phenols by polymerizing propylene with boron trifluoride to a polymer of 18-24 C atoms per mole and reacting the polymer over the same catalyst with phenol at 30-50° C. W. C. Offutt (2,684,389 to Gulf Res. and Dev. Co.) alkylates phenols with a mono-olefin by countercurrent flow over a silica-alumina catalyst. Between 2 and 4 moles of olefin are charged per mole of phenol at temperatures of 250-350° F and pressures of 250-350 psig. A method for the separation of alkylphenols is proposed by F. A. Sullivan and K. W. Saunders (2,684,388 to American Cyanamid Co.). The mixture is solvent extracted with two solvents immiscible with each other, namely, bis-(2-cyanoethyl) ether and a low boiling saturated hydrocarbon. Dealkylation of phenols over an acid acting catalyst at 100-300° C is disclosed in 2,676,191 (J. R. Hoatson and R. H. Rosenwald to Universal Oil Products Co.)

An example for the production of a detergent from an alkylbenzene is given in 2,676,185 (D. S. Melstrom and G. J. Carlson to Shell Dev. Co.). The alkylbenzene with a long side chain is reacted with oleum of 15-30 percent initial concentration at 5-50° C and 5-50 psi. The product is fed into an aqueous solution of a base of 20-30 percent concentration and of pH 7-10 at 50-90° C.

Isomerization and Separation of Xylenes

Production and consumption of xylenes has soared in recent years. Large amounts of these aromatic compounds have become available from the naphtha reforming processes. Since the xylenes, however, are always found in isomeric mixtures and since not all the isomers are in equal demand in the chemical industry, isomerization to the preferred isomer and separation of individual isomers out of their mixtures have become of considerable importance. An increasing number of patents is issuing on these subjects, a trend which can probably be expected to continue for some time, as more and more organizations in the petroleum industry become active in the marketing of petrochemicals.

G. Holzman and G. M. Good (2,656,397 to Shell Dev. Co.) carry out an isomerization of xylenes in the vapor phase at 350-485° C and at 50-1,000 psi pressure in the presence of hydrogen. Alumina rich xerogel, promoted with 0.5-3 percent fluorine is the catalyst used. Very little ethylbenzene is formed. The conversion of p-xylene to a product containing more than 85 percent m-xylene is the object of 2,662,925 (D. A. McCauley and A. P. Lien to Standard Oil Co. of Ind.). The xylenes are contacted in single phase homogeneous solution at 60-90° F with 1-3 moles of borontrifluoride per mole of p-xylene and with 100-300 vol. percent liquid hydrogen fluoride. Production of meta-xylene from other xylenes can also be accomplished by contact with titanium tetrafluoride in hydrogen fluoride solution at a temperature below 185° F (2,683,758, D. A. McCauley and A. P. Lien to Standard Oil Co. of Ind.). R. F. Pfennig (2,632,779 to Standard Oil Dev. Co.) suggests a method for isomerizing a xylene mixture from which p-xylene has been largely removed. The isomerization is carried out at 800-1,150° F and 50-500 psig in the presence of hydrogen over an oxide or sulfide of group VI of the periodic system.

Para-xylene removal from isomeric mixtures is described in three Standard Oil Dev. Co. patents. J. D. Booker in 2,651,655 uses a method of repeated and controlled crystallization and of centrifuging the crystals formed. A method for the selective crystallization of p-xylene is contained in patent 2,672,487 (B. R. Tegge, C. S. Carlson and J. Stewart). According to J. M. Powers and R. A. Speed, (2,688,045), p-xylene may be separated by selective crystallization from a feed stock containing it along with at least one other isomeric xylene in a concentration of 12-25 vol. percent. Crystallization and

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YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

filtering are also employed by R. L. Humphreys, G. C. Brock and C. K. Reynolds in 2,659,763 (to California Research Corp.). Alcohols, aldehydes or ketones, containing 1-4 C atoms per mole are added prior to separating the crystals from the mother liquor.

Extractive separation of isomers is described in 2,685,762, 2,683,763 and 2,683,764 by D. A. McCauley and A. P. Lien (to Standard Oil Co. of Ind.). The solvent, used at 0-125° F, consists of 5-500 vol. percent of HF containing less than 2 mole percent (based on xylene) of titanium tetrafluoride. The raffinate and extract phases contain different ratios of isomers. Similar results are obtained with hydrogen fluoride-columbium pentafluoride and with hydrogen fluoride-tantalum pentafluoride as solvents.

Xylene separation by azeotropic distillation with 2-methoxyl-ethanol is proposed by G. H. Foxon (2,672,436 to Imperial Chemical Industries). An amount of water is added to the distillation which is insufficient to permit formation of two liquid phases or formation of ternary azeotropes. A Schneider (2,648,712 and 2,648,713 to Sun Oil Co.) separates o-xylene from m- and p-xylene by subjecting the mixture to alkylating conditions in contact with isobutylene and alkylation catalyst, such as hydrogen fluoride. The ratio of i-butylene to o-xylene is kept in the range 0.5-1.1. O-xylene is selectively alkylated and separated from the mixture by fractionation. The alkylate is then dealkylated over a cracking catalyst.

Oxidation

Although aromatic aldehydes, ketones and acids have received much attention, relatively little has been published in the recent patent literature on direct oxidation of aromatic hydrocarbons. According to 2,684,984 (H. de V. Finch and K. E. Furman to Shell Dev. Co.) cycloparaffins are oxidized to the corresponding alcohols and ketones with a gas containing molecular oxygen. The reaction is carried out at 100-180° C in the presence of 0.005-0.1 mole (per mole of cycloparaffin) of a monobasic carboxylic acid having from 1-6 C atoms per mole as the sole catalyst. D. C. Hull in 2,673,217 (to Eastman-Kodak Co.) describes a method of direct oxidation to toluene acid, uvitic acid, etc., at relatively low temperature. An active catalyst solution is prepared by treating a solution of 2-8 percent metal ion in a lower aliphatic acid with an aldehyde and a gaseous oxidizing medium containing free oxygen. The aromatic hydrocarbon is treated with this solution and gas at 5-90° C. The formation of maleic anhydride from benzene over a catalyst comprising a specially bonded silica impregnated with vanadium oxide is disclosed in 2,674,582 (J. R. Darby to Monsanto Chemical Co.). G. G. Joris (2,681,936 to Allied Chemical and Dye Corp.) discloses liquid phase oxidation of cumene to cumene hydroperoxide in contact with solid sodium carbonate.

Aromatic Chemicals

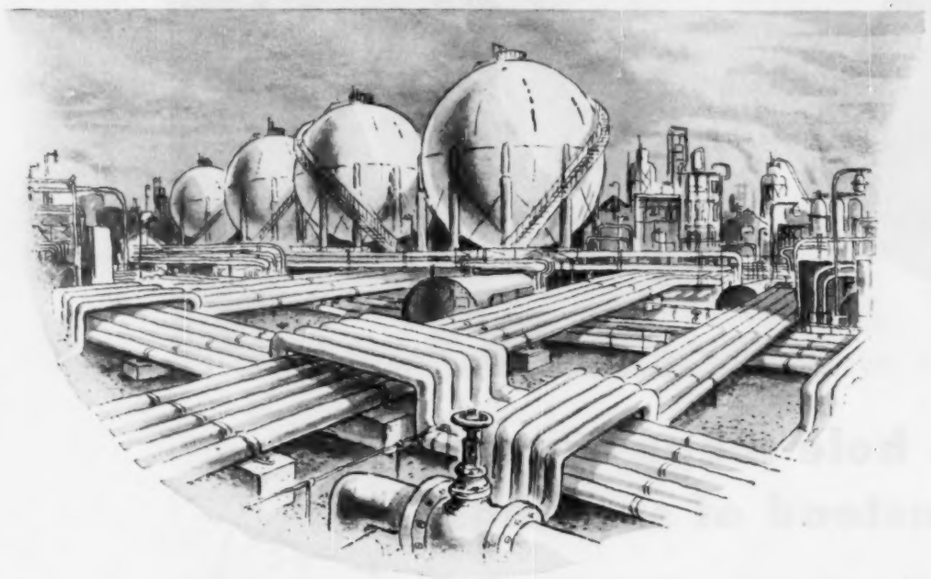
In this section will be discussed some miscellaneous examples of compounds which are produced either directly from petroleum or from cylic compounds serving as intermediates. The number of such compounds that has been produced and reported in the patent literature is very large and the few examples given will only illustrate some trends of current investigations.

D. A. McCauley and A. P. Lien in a group of Standard Oil Co. of Ind. patents (2,683,759 to 2,683,761) discuss disproportionation reactions over a catalyst comprising liquid HF and titanium tetrafluoride. Meta-diethylbenzene can thus be obtained in excess of thermodynamic equilibrium quantity from ethylbenzene at 0-175° F and under sufficient pressure to maintain liquid phase. Trimethylbenzene is obtainable from xylene at above 185° F.

H. Pines and V. N. Ipatieff (2,645,670 to Universal Oil Products Co.) have produced 1, 2, 3, 4-tetramethylbenzene from pinane by dehydrogenation and isomerization over a platinum containing catalyst at 250-425°C in the presence of 1-5 percent of an alkyl halide. D. A. McCauley and A. P. Lien (2,644,017 to Standard Oil Co. of Ind.) make 1,3,5-triethylbenzene from diethylbenzene by reacting the latter in the absence of other aromatic hydrocarbons in a single phase homogeneous system with from 50-600 vol. percent of liquid hydrogen fluoride and 1-5 moles borontrifluoride per mole of diethylbenzene. The reaction is carried out at 60-100° F. for 1-30 minutes.

Pinylthiophene is one of a group of cyclic sulfur compounds on which Socony-Vacuum Oil Co. has obtained patents. According to G. I. Johnson (2,658,901 and 2,658,902), terpenes and an alkylatable thiophene are condensed in the presence of a liquid catalyst consisting essentially of 85 percent phosphoric acid. A condensation temperature below 120°C is employed.

A process for making alkylphenols from gasoline constituents is disclosed by W. W. Johnstone in 2,676,192 (to Universal Oil Products Co.). Gasoline containing phenols is treated with an alkali metal hydroxide solution. The phenol rich solution is then treated with hydrocarbon gases containing more acidic components and olefins under sufficient pressure to maintain the gases in liquid phase. Alkylated phenols and polymer are formed. The production of an aromatic polymer having a low power factor is the subject of 2,660,572 (C. F. Feasley to Socony-Vacuum Oil Co.). An aromatic stock of a boiling range of 360-560°F is heated to 250°F together with formaldehyde and in the presence of Super Filtrol as a catalyst. The liquid portion of the reaction product is then treated with an adsorbent at 180°F and finally fractionated under reduced pressure.



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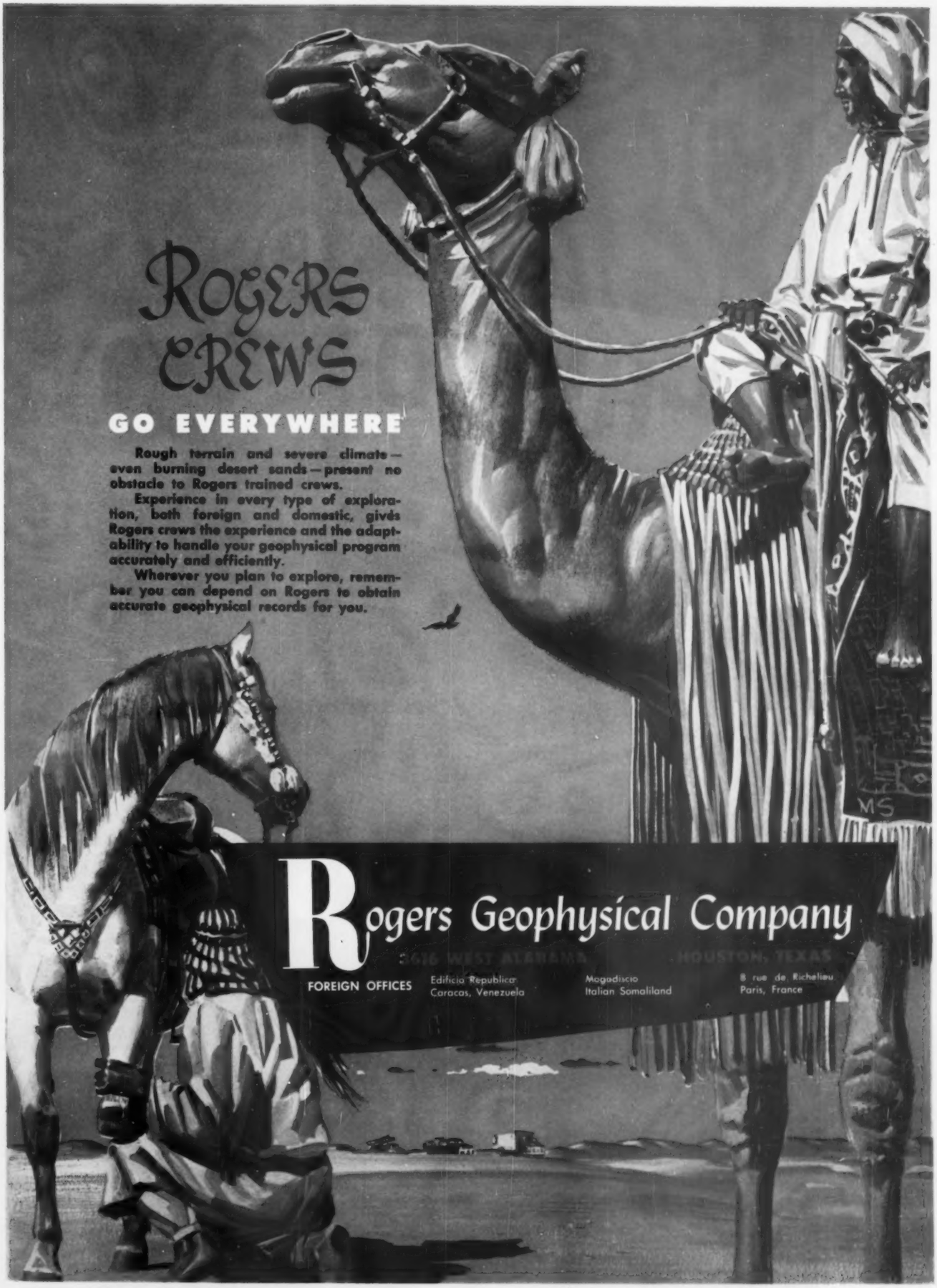
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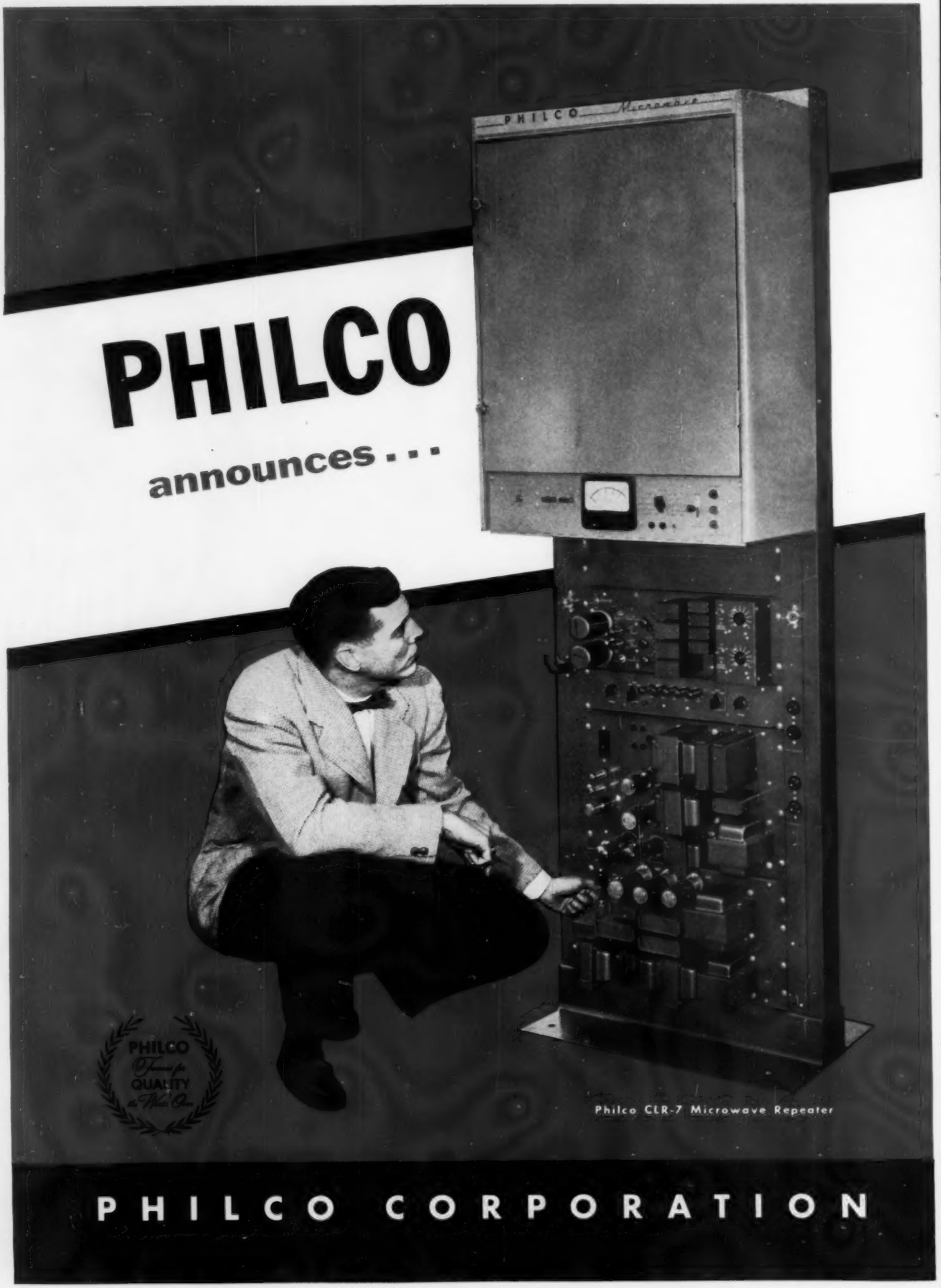
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Helicopters are widely used in geophysical work on the Gulf Coast as well as for transportation of personnel and general communication with drilling operations in the coastal marshes. Photo courtesy Bell Aircraft Corp.

California Offshore

(Continued from page 83)

connecting hydraulic couplings. All engine power can be thrown to the drawworks. Normally the unit supplies 205 hp to the table and 410 hp to the main pump.

Mud pump and standby are both located in the substructure with two 190-barrel tanks. Two shale shakers were set above one of the tanks which was divided into two sections, one used for a shale pit. Mud guns are conventional.

A Lee C. Moore 126-foot mast was employed in the drilling. The entire structure measures 38½ feet by 22¾ feet wide with a height of 15 1/3 feet from the derrick floor. Overall length including pipe racks is 68 feet. Measurements were even less than had been anticipated when design was undertaken.

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Western Canada Gas

(Continued from page 87)

kept clear of silt drifting downstream.

Special precautions were taken to prevent any damage to the anti-corrosive covering on the pipe during the crossing work. An asphalt felt was put over the coating as a rock shield, and strings of two inch by two inch wooden slats were placed around that as additional protection.

Because there was not enough room on the American side of the river to string out the 2,100 feet of pipe required for each crossing, the pipe was welded into six lengths—three for each crossing.

Cast iron weights, weighing about 3,400 pounds each, were spaced at 24-foot intervals to keep the pipe down. When the pull was completed, divers "walked the pipe" under the river to make sure it was in the ditch as planned. The fathometer provided another check on the position of the pipe after pulling. When all checks showed the pipe to be properly positioned, the dredging barge backfilled the ditch.

In the far west, post mortems still are being held. Various individuals are pointing out why the U.S. Federal Power Commission refused to give a permit for the importation of Peace River gas to Washington and Oregon.

In a recent address before the Calgary Canadian branch of the Institute of Mining and Metallurgy, C. O. Nickle, M.P., said that the Canadian Petroleum Association should become active in seeking markets for Canadian gas south of the border.

He also brought forward once again the great need of a meeting between top officials of both Canada and the United States with a view of securing a pattern covering gas export which would be acceptable to both countries.

Continuing, he said: "In addition to being competitive in price, our gas must offer a firm guarantee of continuity of supply, for huge sums must be invested not only in transmission and distribution of pipe line systems, but also in appliances in homes, stores and industry to utilize gas."

In referring to some of the main reasons why Washington's FPC rejected Westcoast's application, Mr. Nickle named them as follows:

(a) The Alberta government was too stingy in its attitude towards gas export.

(b) The Conservation Board was too conservative in its estimate of gas reserves.

(c) Both the Board and the Alberta government should have been bolder in their attitude towards export.

(d) The Canadian government committed its first blunder by issuing only a one year permit.

(e) Canada retained the right to cut off the gas supply to the United States if it was needed in this country.

(f) The Canadian government retained legislation giving the right by order in council to impose an export tax up to 10 cents per thousand cubic feet of gas.

(g) This right, if exercised, could price gas out of the U. S. market.

When asked at the meeting as to why no firm dedication of gas export in adequate volume for the period of the long term permit has been granted, and why the power to impose export tax without public hearing had been retained, Mr. Nickle replied: "Fear of political consequences."

In the meantime, R. C. Fish, president of Pacific Northwest Pipe Line Corp., which won the right to serve the Pacific Northwest, during a recent visit in Vancouver indicated that he is willing to talk about buying Peace River gas. He was quoted as saying, however, that he will not buy a cubic foot of gas from Westcoast Transmission Co. This statement reveals the bitterness which developed during the long hearings at Washington before the FPC.

Westcoast officials now are reported to be seeking a market for natural gas in California. It will be remembered that California opposed the Pacific Northwest proposal on the theory that gas from the Four Corners area is needed to supply California markets.

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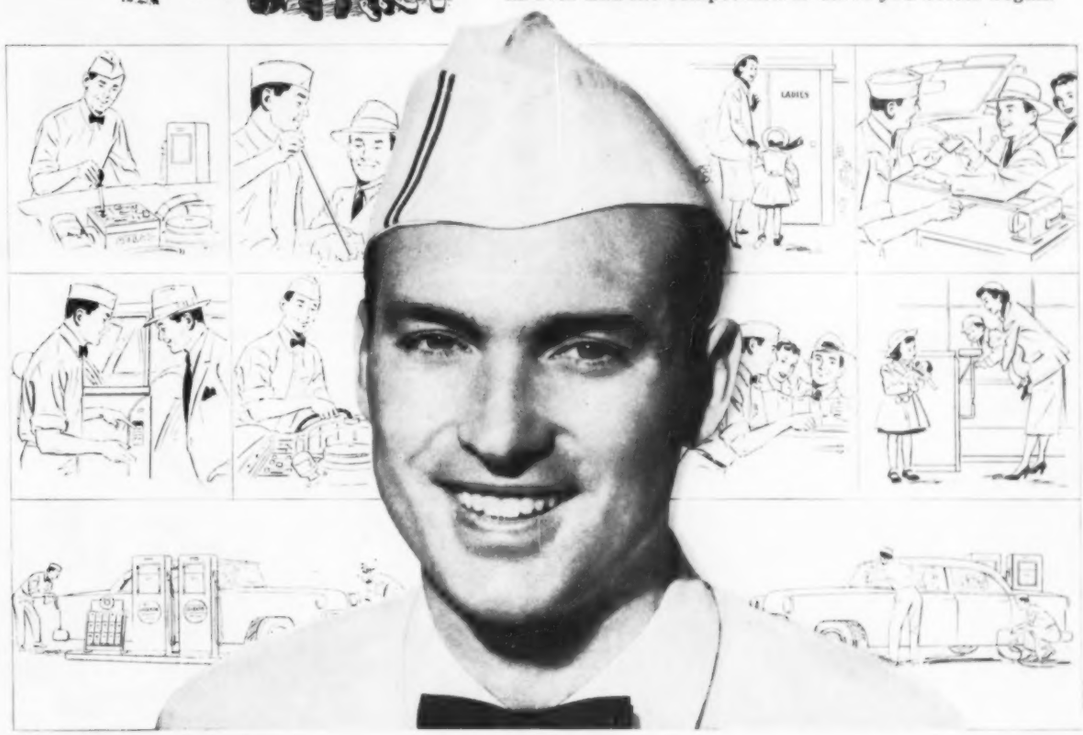

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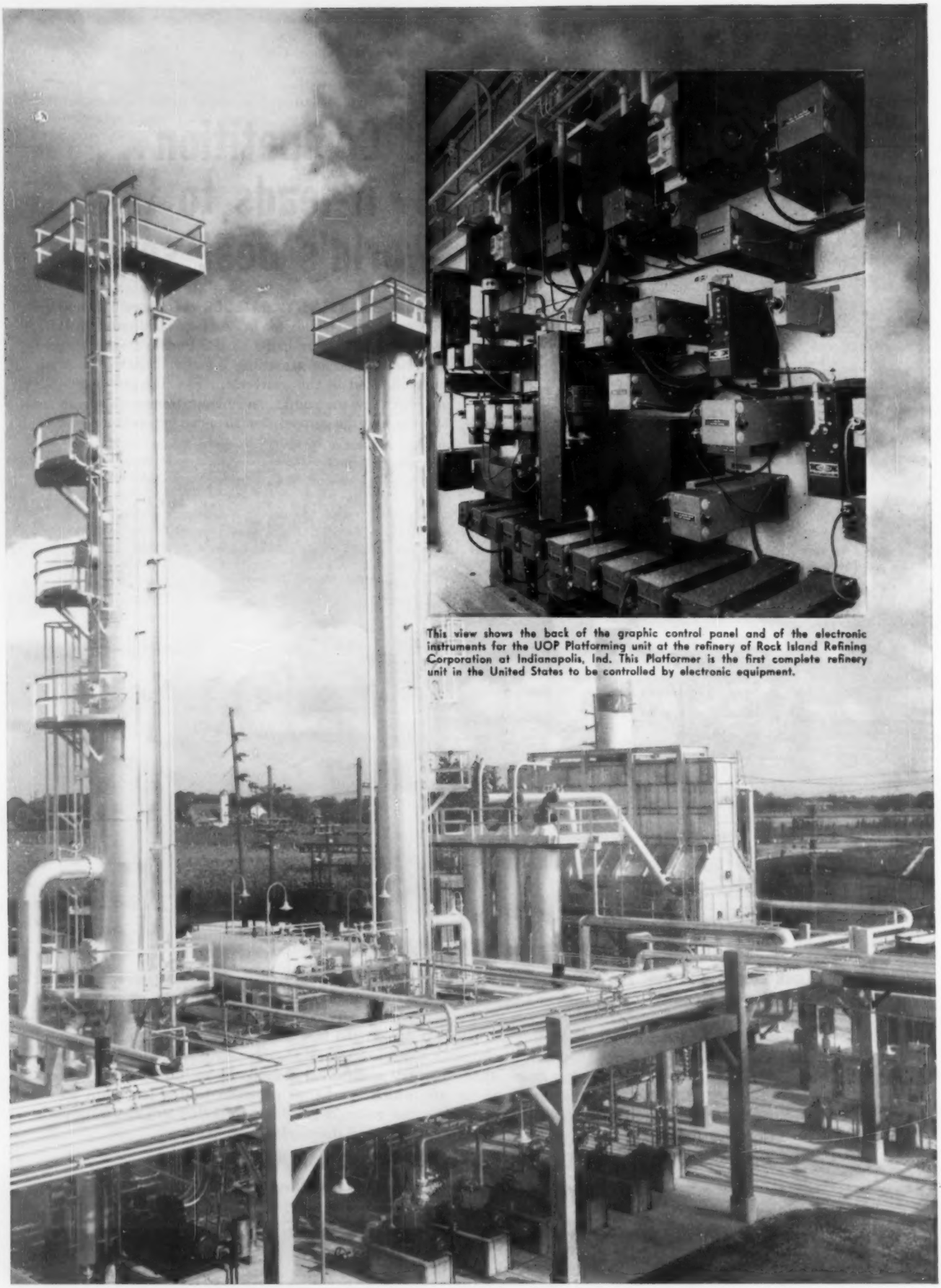


This view shows the back of the graphic control panel and of the electronic instruments for the UOP Platforming unit at the refinery of Rock Island Refining Corporation at Indianapolis, Ind. This Platformer is the first complete refinery unit in the United States to be controlled by electronic equipment.

Rock Island Refining Corp. Has First Complete Refinery Unit Controlled By Electronics

By L. E. Winkler
President
Rock Island Refining Corp., Indianapolis, Ind.

PROGRESSIVE thinking and action are vital to our refining operations. Since Rock Island Refining Corporation was organized in 1940, we have constantly sought to maintain our position as one of the most modern refineries in the world, dedicated to staying in the forefront of the petroleum refining industry as it produces higher quality products.

L. E. Winkler

Rock Island was the first refinery in the world to install a graphic control panel, a device which since has revolutionized the control of refinery processes. It was also one of the first refineries anywhere to build a UOP "stacked" Fluid Catalytic Cracking unit.

Now Rock Island has scored another "first"—a complete refinery unit which is instrumented by electronics.

The new type of instruments are controlling our 2,400 barrel-per-stream day UOP Platforming unit, which went on stream recently to produce motor fuel blending component. Although the Platformer has been running only a short time, the electronics equipment already has paid dividends through a smoother startup and easier handling.

Our decision to install electronic controls was based on economic factors as well as our desire to keep ahead of the industry in modern refining techniques. We took a long-range look at the potentials of this new type of equipment and ascertained that:

(1) It would increase the reliability of the Platformer's operation in cold weather by eliminating the possibility of freezing up of instrument transmission lines.

(2) It would do away with racks for the pneumatic tubing from the graphic panel to the battery area, thus reducing initial installation costs and problems connected with startup and maintenance operations.

(3) It would result in better control because of the increased sensitivity of electrical impulses.

Controls Work Perfectly

The electronic controls worked perfectly from the very beginning. On the day selected for the startup of the Platformer, oil was put into the unit at 9:30 a.m., and in less than three hours the unit was completely "lined out"—operating smoothly at the desired conditions. In less than two weeks, the unit had fully proved itself and had come to be considered a part of our routine refinery operations. Universal Oil Products Company designed, engineered and licensed the Platformer. UOP's instrument department engineered the installation of the electronic controls.

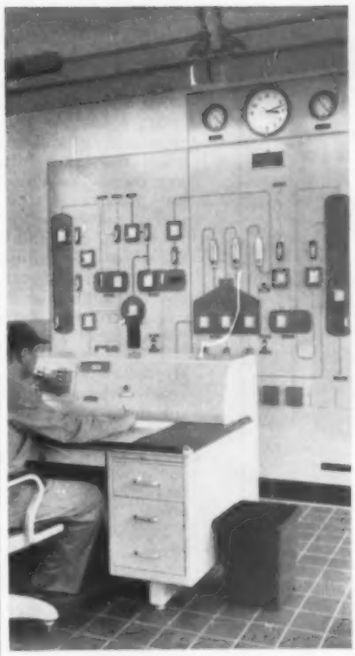
In our instrumentation, transmitters located in the battery area of the Platformer measure temperatures, pressures and flow and convert them to electrical signals. These go to recorders located on the graphic panel and to controllers, also located on the panel.

The controller compares the signals with a signal from the set point mechanism on the recorder that has been set previously by an operator. The controller sends out a current signal to the control valve, causing it to assume a given position. In the event the transmitter signal does not match the set point signal exactly, the controller modifies the current signal to the valve, located in the battery area. At the valve, the current signal is converted to a pneumatic pressure corresponding to the current signal in order to supply the power necessary to position the valve. This causes the valve to either open slightly or close slightly in order to bring the transmitter signal back into line with the set point signal.

Electronic Controls Act Swiftly

We have found that the electronic controls give almost instantaneous response when there are variations in temperature, pressure or flow through the Platforming unit. In addition, there are few moving parts in the equipment, thus reducing maintenance and wear. There is also complete interchangeability of parts, making it as easy to change parts as it is to change a light bulb.

We at Rock Island are proud to be the first refinery in the United States to install complete electronic controls to operate a major processing unit, and we believe sincerely that this instrumentation will go far toward helping us to consistently make better petroleum products from the crude oil that we process.



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Energy Markets

(Continued from page 53)

what can we do about it? There is much we can do about it, and I wish to emphasize one or two very important things which every one of us can do, no matter what may be his station in the industry.

First, it goes without saying that we can solve a problem only by accident unless we have a clear and complete understanding of what the problem is.

Moreover, we must strive to get a clear understanding and appreciation of the problem from the other fellow's standpoint as well as our own. The day has gone when any important problem in the oil industry can be effectively solved without regard to the ultimate impact of the solution upon all essential segments of the industry. We must try to know and understand the position of the producer, the pipeliner, the refiner and the marketer in every problem presented, and then we must do our level best to find an answer which most nearly serves the best interests of the whole. By following this cooperative method, we will reach what might be called an "integrated" solution.

People in the oil industry pretty well understand what an integrated oil company is— a combination of producing, transporting, manufacturing and marketing investments and operations.

Injury to any part of an integrated oil company impairs the strength and vigor of the entire corporate body. Similarly, injury to any part of an industry impairs the strength and vigor of every other part.

For the foreseeable future, our refiners and marketers will continue to occupy the front-line trenches in these competitive battles for markets, energy, fuel, petrochemicals and so forth, or at least so it seems to me. They are the fellows who must meet and "sell" the millions of consumers who make up our mass markets and in that capacity they have a terrific responsibility not only to their own organization, but to the entire industry. They have done and will continue to do a great job in holding old markets and finding new ones by improving products, upgrading markets, reducing costs and using every other means at their command. To do the best job, however, they need the sympathetic understanding and the full cooperation of every other branch of the industry.

In this vital quest for relevant facts and understanding, an important and far-reaching development occurred recently. In one of his many constructive moves, the President of the United States has created a top-level committee to undertake "a study to evaluate all factors pertaining to the continued development of energy supplies and resources and fuels in the United States, with the aim of strengthening the national defense, providing orderly industrial growth, and assuring supplies for our expanding national economy and for any future emergency".

The committee is composed of the head of the office of Defense Mobilization as chairman, and the Secretaries of State, Defense, Justice, Interior, Commerce and Labor. Coal supplies and requirements, as well as petroleum and natural gas, are to be subject to review. Experts in each of these fields outside of the government are to participate as consultants. Committee recommendations are to be submitted not later than December 1, next.

This action is particularly timely. It is recognition from the top that those charged with the responsibility of supplying the nation's energy and fuel requirements in peace and in war do have important problems. The study should make an invaluable contribution to our knowledge of the overall problem. We must remember, however, that committees, even at the Cabinet level, are much the same as individuals in that the quality of their thinking is affected in large measure by the quality of their information. And so it behooves us to make sure that all the relevant facts with respect to the oil industry's story are laid before this committee as quickly and as effectively as possible.

The marketing and other problems confronting us are numerous and complicated and they have many ramifications. Each presents its own challenge for understanding, adjustment, adaptation and final solution. In some instances the solution may benefit all or several segments of the industry; in others, the solution may be detrimental to all or some segments of the industry. It will be our responsibility to maximize the benefits and minimize the detriments for the whole. The oil industry has proved many times that it is no amateur at the job of solving problems. As long as we can pull together with great trade organizations like the American Petroleum Institute, which I have the honor to represent, it is my belief that the industry can face the future and its problems with complete confidence.

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Magic Barrel to Tour Europe

The "Magic Barrel," developed by the du Pont Company's petroleum chemicals division to show the public a few of the vast number of products derived from petroleum, started a tour of Europe on October 4. Shown preparing to board the European-bound plane with the barrel are R. Carter W. Jones (left), sales promotion manager of the du Pont petroleum chemicals division, and Roberts W. Brokaw (right), sales promotion specialist.

The "Magic Barrel," developed by the du Pont Co. as a public relations tool for the oil industry, starts a European tour October 4. The barrel is being taken abroad by R. Carter W. Jones, sales promotion manager of the du Pont Company's petroleum chemicals division, and Roberts W. Brokaw, sales promotion specialist, who has trained speakers to present the "Magic Barrel" throughout the United States. They will represent the du Pont Co. in the National Sales Executives annual tour to exchange sales ideas with European businessmen. The barrel demonstration of chemicals from petroleum will show how a public relations device can help sell an industry to the public.

Undersea Pipe Line

Continental Oil Company, Magnolia Petroleum Company and Newmont Oil Company have confirmed plans for construction in the Gulf of Mexico of the world's longest undersea pipe line.

In a joint announcement, the three companies, which operate as a team in Louisiana-Gulf offshore areas, announced that a contract has been awarded for the project to Brown & Root, Houston, to lay a 48-mile undersea gathering line from Burns Terminal on the coast of St. Mary's Parish, La., out into the Gulf of Mexico to Block 126, Eugene Island oil field, most distant offshore oil discovery in the Continental Shelf, 25 miles from the nearest land. Upon completion, the line will be operated by Magnolia.

The submarine pipe line, designed to carry both crude oil and gas from offshore fields, will run in a dog-leg pattern out from the Louisiana shore to Blocks 45-51, Eugene Island field area, where both oil and gas are produced, and on out to Block 126 oil field area.

According to the announcement, the first phase of the line extending to Blocks 45-51 will be completed this year, and the rest of the construction will be finished around the middle of next year.

The undersea line will be a 12-inch electric welded steel pipe with a double coal tar enamel wrap and a one and one half inch reinforced concrete coating. The contract for wrapping and coating the pipe has been let to Rosson Richards of Harvey, La.

At the present time the Magnolia-Continental-Newmont Companies are producing more than 5,000 barrels of crude oil daily from their leases in the Louisiana-Gulf waters. With new production, that figure should be nearly doubled upon the completion of the pipe line.

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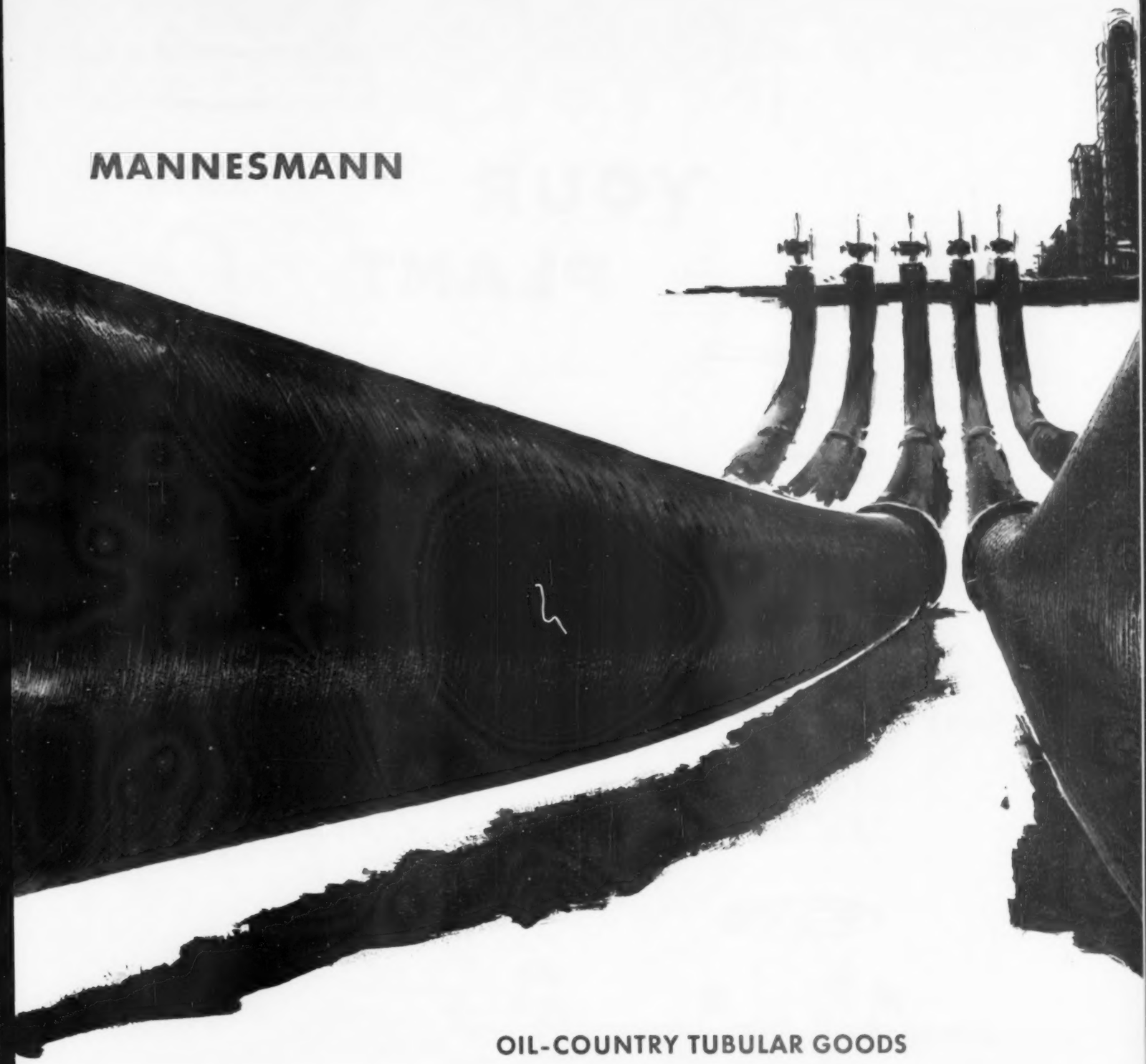

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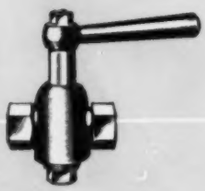

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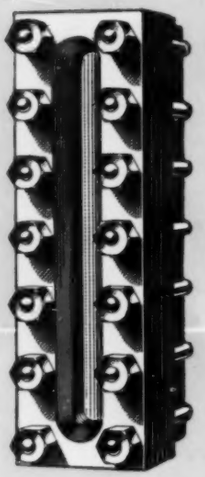

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BRITISH OIL NEWS

By E. Lawson Lomax

THE COUNCIL OF BRITISH MANUFACTURERS of Petroleum Equipment held its 11th annual general meeting on September 30 followed by a luncheon held under the presidency of Douglas Wilson of United Steel Companies Ltd., chairman of the Council. The principal guest and speaker was Lt. Col. S. M. J. Auld, president of the Institute of Petroleum and honorary member of the Council.

In his welcoming address, the chairman said that the Council looks upon the whole oil world as a market for the products of its member companies, and therefore it was fitting that this gathering should be strongly international. He cited lists of products manufactured in the United Kingdom for use in the oil industry as evidence of the versatility and comprehensiveness of the equipment industry and the vast strides it has made in this direction in the past decade.

Among the many matters engaging the attention of the Council, said the chairman, not only with respect to the present, but also as to future policy, is the question of research. The petroleum industry is a virile and progressive one and its advancement is of vital interest to the nation, and he wished to impress on universities and research laboratories the urgent need to promote an intensive interest in all branches of petroleum technology. To this end the manufacturers of plants should keep in close touch with these organizations and also the highly qualified technologists in the refineries and in the fields with the idea of developing new and more efficient equipment, both for new processes and for process design.

"As a Council," he said "we are not constituted to carry out such research, but we consider it a duty to assist in any such projects where such help is possible and welcome. Many discussions have taken place on this subject, but the time is not yet ripe to formulate the results and plans which will be done in a precise manner, as soon as possible."

Colonel Auld, in reply to the toast in his honor, stated the £80 million value of goods manufactured in this country as shown in the report on oil companies' materials does not include orders placed otherwise than through the major oil companies, nor does it include marine equipment and particularly the building of oil tankers, so that the real turnover is very much larger than these figures show.

Britain is gradually gaining consciousness of its oil interests and responsibilities; the government is giving leadership and assistance in this; the oil companies themselves are educating the public; and the Institute of Petroleum, with its professional members, helps also.

There is little indigenous oil in the country, and although the refining industry has expanded by leaps and bounds recently, it is widely spread over the country and not centralized. If it were, possibly the increase would be more noticeable.

Refineries having been built, the time is coming when repairs and replacements will be required, and the manufacturers should be ready to deal with these as well as the gradual growth of oil consumption at a rate which will double in the next twelve years, requiring more and more equipment.

Test Well on Mafia Island

Following the results of geological and geophysical surveys, preparations are being made by the D'Arcy-Shell Petroleum Co. of Tanganyika to drill a test well on the thinly populated island of Mafia, off the coast of Tanganyika. A test to the depth of 12,000 feet is contemplated.

Expansion at Shell Haven

A new plant for the production of butane and propane gas for liquifaction is now under construction at Shell Haven refinery, at an estimated cost of £300,000. It will have a capacity of 10,000 tons of gas per year. Storage facilities for these gases will be Hortonspheres for butane and high pressure, long, cylindrical vessels, called "bullets" for propane. A bottling plant is also planned, which will contain equipment for pressure-testing steel bottles, and machines for filling them.

Only propane will be bottled for the time being, but bulk loading facilities are to be installed for loading road tankers and rail cars with both propane and butane. Construction work has begun and the site is being prepared by John Laing & Co. Ltd.

Tanker News

Harland & Wolff Ltd. announce the fast replenishment tanker built by them to the order of the Royal Australian Navy was successfully launched from their Belfast shipyard on September 1. Statistics of the vessel are as follows: Overall length 583 feet, beam 71 feet, deadweight 17,700 tons.

Vickers-Armstrong announce that the "Esso York," fifth of six 26,500 dwt tankers being built in British shipyards for the Esso group, was successfully launched on September 27 at Walker-on-Tyne, the launching ceremony being performed by Mrs. Leslie Pollock, wife of a director of Esso Petroleum Co. Ltd. The vessel is 628 feet in length, her speed will be 16 knots and her rate of cargo discharge 3,000 tons per hour.

Sulfuric Acid Plant at Stanlow

During the past month a new 33,000-ton per year sulfuric acid plant, costing £200,000, has been put into commission at Shell's Stanlow refinery. The plant was built in 1952 and is now producing 15,000 tons of sulfur per year.

The new plant uses sulfurous gases and some elemental sulfur for the manufacture of sulfuric acid for Stanlow's own requirements. It is a contact plant of conventional design, in which vanadium pentoxide is used as the catalyst for coverting sulfur dioxide to sulfur trioxide. The plant produces two grades of acid, 98 percent sulfuric and 20 percent oleum.

Chemical-Petroleum Exhibition

Arrangements have now been completed to hold for the first time in the United Kingdom a joint exhibition of chemical plant and petroleum equipment. The exhibition will be known as the Chemical and Petroleum Engineering Exhibition and will take place in the Grand Hall, Olympia, London in June 1958.

It will be sponsored jointly by the British Chemical Plant Manufacturers Association and the Council of British Manufacturers of Petroleum Equipment. The organizers are F. W. Bridges & Sons Ltd., Grand Buildings, Trafalgar Square, London, W.C.2.

Kwinana Construction Progressing

The 2,800-foot L-shaped jetty being built on Cockburn Sound to serve the tankers loading from and discharging to the Kwinana refinery in Western Australia is scheduled for completion in December next and the first tanker is expected to berth shortly after January 1, 1955.

The three berths will have 40 feet of water at low tide and will take the largest tankers operated by the British Tanker Co., Anglo-Iranian's shipping organization.

Since work on the jetty began last year, 550 steel vertical piles and nearly 400 raking or bracing piles have been driven. Most of the 122 concrete 14-ton main cross beams have been installed, together with a large proportion of 416 connecting beams. A 16-foot wide pre-cast concrete decking has been laid along the whole of the structure, and pipe connecting the tanker berths with the storage tanks are being installed along the 20-foot pipe track.

When work started on the jetty over a year ago a fleet of more than 40 small vessels and rafts was assembled in Cockburn Sound. Two pile-driving pontoons, two large barges, and four crane pontoons, which have been used to lift steel piles into position for the pile-drivers, were shipped from the United Kingdom. Several different types of craft were built in Western Australia and others sailed from Sydney to Kwinana. A motor water lighter, which was attached to the naval squadron at the Monte Bello atomic tests, has been used to carry water to the floating plant.

The jetty was built by the Kwinana Construction group of companies made up of Costain-John Brown, D. & C. & Wm. Press Ltd. and Kinnear, Moodie.

An aerial view of the 1,800-foot jetty at which three 32,000-ton tankers will be able to berth at one time at Anglo-Iranian's new Kwinana, Australia refinery.

Personnel

The board of C. C. Wakefield & Company Ltd. announces that Leonard M. Broadway has taken over the position of managing director from Alonzo Limb, who has had to relinquish his office owing to ill health, but will continue as a director. Mr. Broadway, who is 50, joined the company 34 years ago. He was appointed secretary by the late Lord Wakefield in 1938. Following a wide experience in administrative and financial matters, including the formation of the Wakefield group of subsidiary companies, Mr. Broadway was elected to the board in 1947, becoming joint assistant managing director in 1952. The position of assistant managing director will be held by Mr. William F. List.

The directors of The Brush Group Ltd., announce that Sir Harold Roxbee Cox has been elected a director of the company.

C. M. Spielman, managing director of Whessoe Ltd. since 1935, has relinquished that position and is succeeded by A. G. Grant, director and general manager of the company. Mr. Spielman is retaining his seat on the board. Mr. Grant joined the company as chemical engineer in 1930, was appointed general manager in 1938 and became a director in 1942. He was educated at Leeds University, where he obtained a degree in gas engineering. He has been chairman of the British Chemical Plant Manufacturers Association; member of the Grand Council, Federation of British Industries; and of the council of the British Engineers' Association. He has also served on the councils of the Institutions of Gas and Chemical Engineers.

Shell-Mex and B. P. Ltd. have made the following appointments: C. A. Pink to be retail marketing manager, London division; C. E. Pike to be marketing service manager, north-eastern division, in addition to his present post of marketing service manager, northern division; and H. Edwards to be operations manager, Scottish Oils and Shell-Mex Ltd.

After 27 years' service with the Shell Group, I. A. Macmillan, manager of Shell Chemicals' London division, is to retire and settle in Jersey. He will be succeeded by A. D. Buckland-Nicks, who is at present head of the detergents division of the chemical industry administration of Shell Petroleum Company Ltd. Mr. Nicks, who is at present on a trip to Canada and the United States, joined the Shell's technical products department on leaving Berkhampstead School in 1939, but within three months was serving with a Middlesex unit of the Royal Artillery. He saw service in France and Germany, and was demobilized with the rank of major in March 1946, rejoining Shell shortly afterwards. He has been largely responsible for the rapid development of detergents in overseas markets since the war.

J. A. Brongers, head of the press division of the Bataafsche Petroleum Maatschappij, was lost in the crash of the KLM plane "Triton" near Shannon in the early hours of September 5. He was born in Haarlem in 1906. Even in his school days he displayed the aptitude for journalism which was to be a decisive factor in his life. After working for a few years as a journalist, he entered the service of the Bataafsche Petroleum Maatschappij in 1928 and was assigned to the correspondence department. In the same year he contributed to "De Bron," the Dutch staff magazine, an article which was to be followed by many others. When the public relations department was formed, he was appointed head of the press service in which position he made many friends for himself and for his company. At the time of his death, he was starting on a three months tour planned for North and South America, where he intended to study the work of his colleagues.

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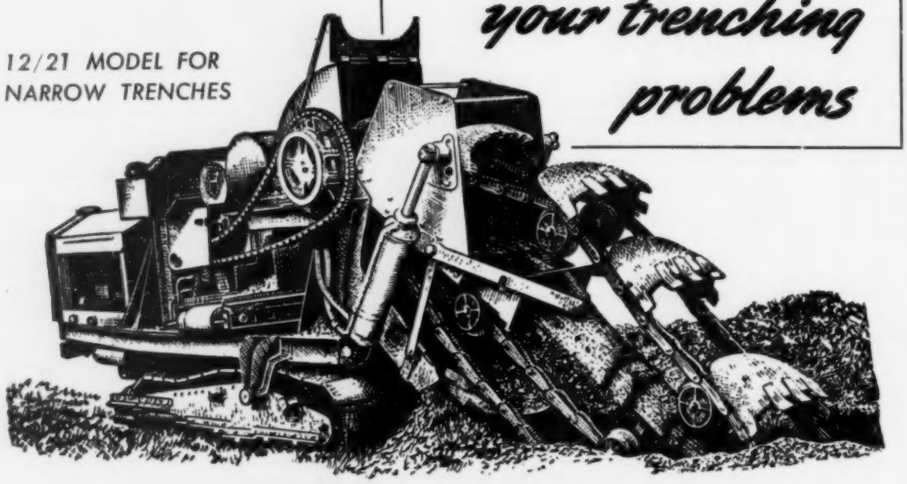

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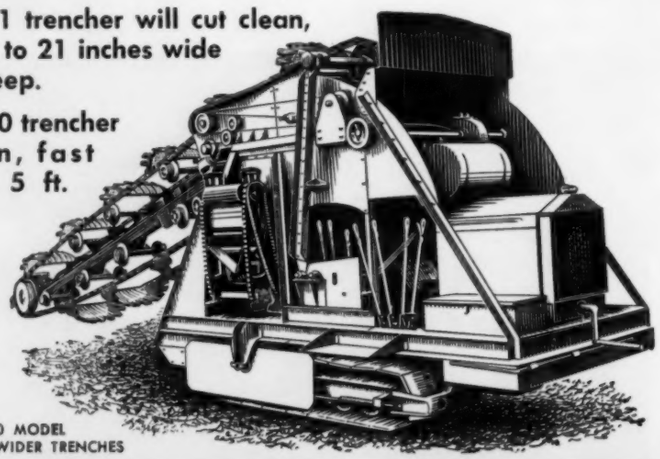

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Grangemouth Expansion Completed

The postwar expansion scheme of Anglo-Iranian Oil Co.'s Grangemouth refinery in Scotland has been completed with the commissioning of the last three units. Throughput of the refinery has been raised from 360,000 tons per year immediately postwar to the present capacity of 2,700,000 tons per year. The cost was over £14 million.

The first of the three latest additions is the Girbotol unit in which the C_3 and C_4 tail gases from the cat cracker are desulfurized prior to passing to the catalytic polymerization unit. Sulfuretted hydrogen and other sulfur compounds are extracted from the feed stock by a solution of diethanolamine and caustic soda, the purified gases then passing to the poly unit. The installation was built by the Power Gas Corp. to designs of the Girdler Corp.

In the catalytic polymerization unit the C_4 stream is converted to a high octane polymer, used as a component for premium grade motor spirit, while the C_3 stream is converted into a tetramer, for use in the production of chemicals in the nearby British Petroleum Chemicals factory. The capacity of this unit is 60,000 tons per year. It was designed by UOP and engineered by Kellog International. It is electronically controlled by instruments supplied by Evershed & Vignoles Ltd.

The sulfurous gases extracted in the Girbotol unit are processed into flake sulfur by burning with a stoichiometric amount of air, controlled by a ratio flow controller. The gases then pass through a boiler feed water heater and are finally cooled by scrubbing with molten sulfur. They are then reheated and passed through a catalyst to complete the reaction. The molten sulfur separated out is collected into a storage pit and from there pumped to flaking machines before going to storage.

This sulfur is used for making sulfuric acid in the acid plant at Broxburn Crude Oil Works, where shale is retorted.

Hamburg Bitumen Plant Operating

Various grades of bitumen required by the German market are now being produced at Anglo-Iranian's Hamburg refinery, where a bitumen plant with a capacity of 315,000 barrels a year has been commissioned. The new plant uses a feedstock residue oil from the vacuum distillation unit commissioned earlier this year.

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INTERNATIONAL NEWS AND NOTES

Pakistan Signs Exploration Agreement With Standard-Vacuum

H. W. McCobb, vice president of Standard-Vacuum Oil Co., and Syed Majad Ali, Pakistan's Ambassador to the United States, at the time of signing the recent exploration agreement.

An agreement between the Government of Pakistan and Standard Vacuum Co. was signed in Washington September 24 under which the Government and Stanvac will join in searching for oil in a 20,000 square mile area—10,000 in East Pakistan and 10,000 in West Pakistan.

The agreement provides that the Pakistan Government will share in the risks of the search through a 25 percent participation in the costs of exploration, the oil company providing the other 75 percent. On this basis, the Government has agreed to invest funds as required up to a minimum of $15 million.

His Excellency Syed Amjad Ali, Pakistan's Ambassador to the U. S., signed the agreement on behalf of his Government, and H. W. McCobb, vice president and director of Stanvac, signed for the oil company.

The areas to be explored are located in the Ganges River delta area of East Pakistan and in the Indus River valley of West Pakistan. A preliminary study of the former area was made about two and one-half years ago by Stanvac by means of an airborne magnetometer survey. Immediately after the signing of the agreement, Mr. McCobb announced that arrangements were already under way to commence detailed geological and geophysical examinations.

The agreement provides that the Pakistan Government will share in ownership of any crude oil discovered on the same basis as its participation in the exploration costs, and that the company will purchase the Government's 25 percent share at its well-head value.

Standard-Vacuum will manage the joint operation and keep the Government informed in detail of the progress of the venture. The company has agreed to train Pakistani nationals for all phases of the operation. If commercial production is obtained, the company has agreed to discuss with the Government the erection of a refinery in Pakistan.

The agreement incorporated a depletion allowance clause which together with other financial provisions will effect a sharing of any resulting profits with the company on a 50-50 basis.

Standard-Vacuum has been marketing petroleum products in the areas which now comprise Pakistan for over 60 years.

Several months ago the company announced a similar exploration agreement with the Government of India covering an area in the Bengal Basin.

Large Mexican Investment Planned

Mexico's oil industry is carrying out a series of improvements that will cost the nation between 400 and 600 million pesos, according to an announcement of the Mexican Chamber of Commerce of New York City made public in Mexico City.

Ninety million pesos of this sum will be spent on the absorption plant being built by the Hudson Engineering Co. in Reynosa which should be completed by February of next year.

Other works taken in under the plan are:

(1) Modernization, by the Fluor Corp., of the existing refinery, including installation of a new cracking unit with a capacity of 55,000 b/d at a cost of around 60 million pesos.

(2) Oil pipe lines from the Angostura field to Joaquin Station, Ver Cruz; from Tampico to Monterrey; new lines in Reynosa and a second line linking Poza Rica with Mexico City.

(3) A gas pipe line from the Tabasco fields to Minatitlan. This will be the longest conduit ever constructed in Mexico and will provide a connection with the existing line between the latter point and Mexico City. On completion, it will be 1,500 kilometers in length.

(4) Exploratory drilling in Tampico Alto, Tres Higueras, Cotaxtla and other districts.

More Drilling in Cuba

Test of a 50-foot section of Echevarvia No. 2, offset to the discovery well near Jatibonico, Cuba, on September 2 at 1,285 feet showed 15 barrels per hour through a quarter inch choke. Location for a third well has been selected. Northeast of the discovery the Cuban American Oil Co. is engaged in test drilling and other interests are actively planning development operations in this promising section of Cuba.

Middle East Production

The following crude oil production figures in the Middle East for the month of July are announced:

	July 1954 Long Tons	Jan.-July 1954 Long Tons
Iraq Petroleum Co. Ltd. (Kirkuk)	2,043,401	12,587,934
Basrah Petroleum Co. Ltd. (Zubair)	417,322	2,461,860
Mosul Petroleum Co. Ltd. (Ain Zalah and Butmah)	111,678	756,573
Qatar Petroleum Co. Ltd. (Dukhan)	403,584	2,668,814
Kuwait Petroleum Co. Ltd.	4,089,294	26,043,445
Aramco	*3,986,118	**27,604,072

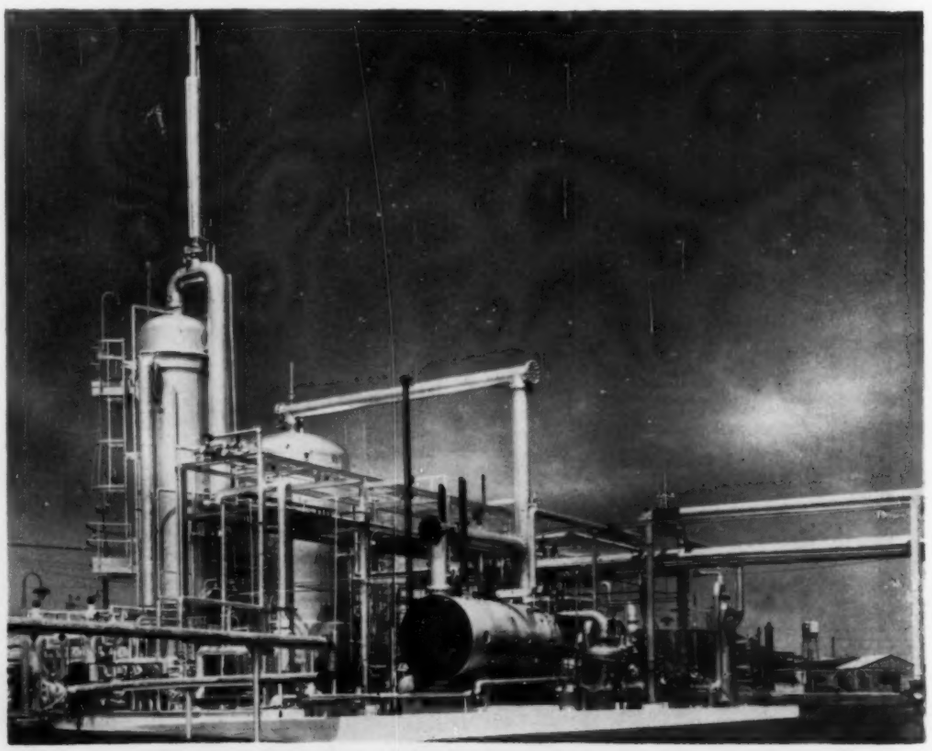
*(29,497,275 U. S. bbls) **(204,270,132 U. S. bbls)

Offshore Well Completed in Peru

Douglas Oil Company of California has completed its second producing well in the coastal area of the Lobitos district in Peru. The well, bottomed at 3,266 feet, 1,200 feet offshore, flowed at the rate of 90 barrels per day of 38 gravity oil on test through a ¼-inch choke. The location is about two miles northwest of the company's discovery well completed last June.

Sulfur Unit Installed at Aruba

A 40-ton sulfur recovery plant and a gas purification unit have been placed in operation at the Aruba, Netherlands West Indies, refinery of Lago Oil and Transport Co. Ltd., a subsidiary of the Standard Oil Co. The Girdler Company designed the unit. Construction work was handled by The M. W. Kellogg Company.



View of the new sulfur recovery and gas purification unit recently placed in operation in Aruba, Netherlands West Indies, by Lago Oil and Transport Co. Ltd.

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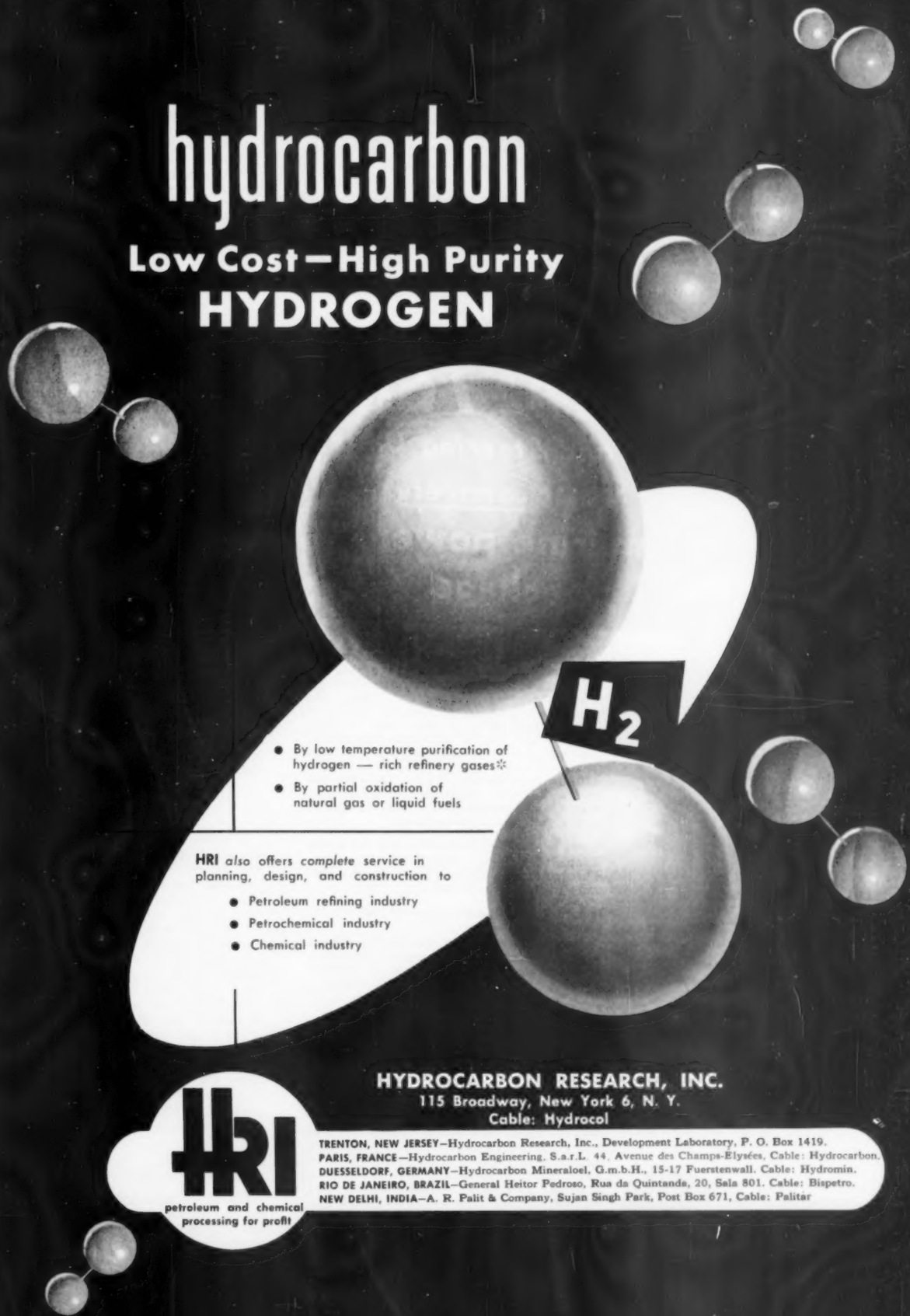

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British Admiralty Studies Welding

In 1943 a committee was appointed by the British Admiralty, called the Admiralty Ship Welding Committee, "to consider and investigate special problems arising from the employment of welding in ship's structures and to advise on methods for their solution." The need for such investigations arose from the several failures which had occurred in welded ships built during the war. At a later date, serious failures occurred in some welded oil storage tanks built in the United Kingdom.

A long series of investigations was carried out, covering all aspects of welded ship construction, and the committee found that the failures resulted from several contributory causes. In the field of design it was found of utmost importance to avoid all forms of notches and discontinuities and to ensure full continuity by careful consideration of the design of connections. The importance of good workmanship coupled with careful supervision and inspection are emphasized to prevent the occurrence of flaws and other defects which might originate fractures. It was found also that close attention must be paid to the weldability and notch toughness of the steel.

Notch toughness, the converse of notch brittleness, is a property of steel to which comparatively little attention had been given in the earlier riveted construction, but which was found to be of prime importance in welded construction generally, not only in ships but in all forms of welded structures.

The problem of recommending standards for adequate notch toughness in the parent steel was considered to be beyond the original committee's scope, and accordingly a new committee has been formed under the chairmanship of Sir Victor G. Shepherd, director of naval construction of the Admiralty, to deal particularly with the problem of brittle fracture in structural steel, under the following terms of reference:

"To make such recommendations as may be practicable or desirable regarding the quality and testing of structural steels, with special reference to brittle fracture and suitability for welded construction. To consider the programs and results of research in these fields and to institute any further investigations considered necessary."

The committee, although set up by the Admiralty, is representative of a wide range of interests, including shipbuilding, steelmaking and structural fields generally, and its findings will be received with interest by users of structural steel.

Mexican Operations

Oil operations in Mexico reviewed in the annual address of President Adolfo Ruiz Cortines to the Congress on September 1 may be summarized as follows:

Reserves now total 2.4 billion barrels, an increase of 166 million barrels since 1953. In the past year 315 wells were drilled and 15 new oil and gas fields discovered. Footage drilled totaled 1,615,000 feet, an increase of 230,000 feet over the previous year.

Of the 315 wells drilled, 215 were producers. Current producing capacity of Mexican wells is reported at 253,000 b/d, with demand for domestic uses and export at 217,600 b/d. Production during the past year totaled 78 million barrels or 213,000 b/d.

President Cortines also reported that 878 kilometers of pipe line were laid. He stated that the new Tampico-Monterrey and Poza Rica-Mexico City lines soon will be completed.

The Salamanca lube plant was scheduled for completion in September. Current construction programs include the building of a new refinery at Minatitlan, enlargement at Reynosa and modernization at Ciudad Madero.

The President made special mention of the new Miguel Hidalgo field in Vera Cruz where the discovery well was rated at 3,000 b/d. The oil is of high quality. Mention was also made of current wildcatting operations in Lower California.

New Refinery for Egypt

A new company, as yet without a name, is in process of organization with the object of building a new refinery in Egypt with an initial capacity for treating 200,000 tons of crude a year, with provision for expansion to 500,000 tons or more. The project is being promoted by the Societe Egyptienne des Petroles (SEP), the National Petroleum Co., Caltex, the Industrie du Petrole, S.A. (a Swiss concern), and certain minor Egyptian groups. Arrangements have been made to transfer the equipment of a refinery now existing in Switzerland and owned by the IPSA to Egypt and to relocate it on a site leased from the government at a nominal rental. The entire product of the new plant will be distributed by the National Petroleum Co. and IPSA as exclusive agents. The expectation is that when the new plant has been fully expanded, imports of refined products into Egypt will no longer be necessary.

Saudi Arabian Production

Crude oil production in Saudi Arabia during August amounted to 28,492,455 barrels, an average of 919,111 barrels per calendar day, it is announced by the Arabian American Oil Company.

Crude processed at the company's refinery at Ras Tanura during August amounted to 6,955,051 barrels, an average of 224,357 barrels per calendar day.

Crude oil production for the first eight months of 1954 amounted to 232,762,587 barrels, an average of 957,871 barrels per calendar day. Crude run in the refinery for the same period was 53,963,958 barrels, an average of 222,074 barrels per calendar day.

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Mexican Ammonia Plants

Petroleos Mexicanos is to extend its operations into the fertilizer field with the erection of two ammonia plants. One will be built in Vera Cruz and one in Guanajuato. Cost of the two plants is estimated at $30 million.

Officials of the Nacional Financiera, government lending agency, predicted the Minatitlan factory will be able to turn out 150,000 tons of various types of fertilizers annually while that at Salamanca will produce ammoniac fertilizers sufficient to supply 100,000 hectares of cultivated lands.

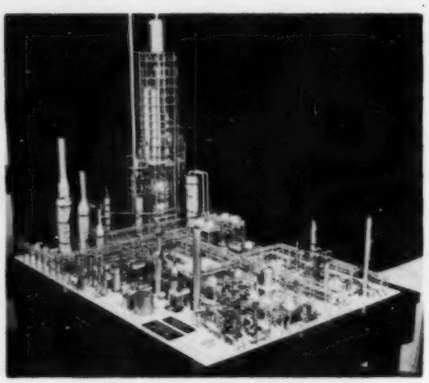
Economy Ministry spokesmen said the government's decision to enter this field marks commencement of an all-out national drive to "capture this market, which virtually is dependent upon importation, with a resultant disequilibrium in the country's trade balance." Installation of the new plants will almost triple the country's production of fertilizers.

Another part of the general plan consists in modernization of the Arbol Grande refinery, where four new units, including one devoted entirely to petrochemistry, will be installed.

Meanwhile, the Labor Ministry disclosed it is promoting still another phase of the program, drawn up by Juan Filolao San Juan Soto, calling for complete utilization of Mexico's gas reserves. His proposals call for a five-year plan of public works covering derivation of numerous petroleum products not now extracted from the raw materials but which are urgently needed by Mexican agriculture and industry.

Appoints African Distributor

IDECO, one of The Dresser Industries, has announced the appointment of Neyrpic-Afrique of Algiers, Algeria, as a distributor and repair depot for IDECO oilfield drilling, workover and servicing equipment, as well as other IDECO exclusive petroleum equipment and supplies. The new agent will serve the North Africa area including Algeria, Morocco and Tunisia.



New Cat Cracker for Brazil

The world's largest airlift Thermofor catalytic cracking (TCC) unit is soon to be completed near Sao Paolo, Brazil, at the new Capuava Refinery of Refinaria E. Exploracao de Petroleo Uniao, S. A., a Brazilian private-enterprise company.

The TCC unit will have a charge capacity of more than 25,000 barrels of crude oil a day and will be the first moving-bed catalytic cracking unit in South America.

Hydrocarbon Research, Inc., of New York, is the engineering-contractor firm for the project. Socony-Vacuum Oil Company, Inc., provided the best basic design for the Capuava unit.

Next International Petroleum Exposition

The next International Petroleum Exposition of Tulsa will probably be held in 1957 or 1958, according to Wm. B. Way, general manager, who said that the Tulsa show is in no way connected with the "International Oil Exposition" announced to be held in Houston in 1955.

New Italian Refinery on Stream

The refinery erected by ICIP (Industrie Chimiche Italiane del Petrolio) a subsidiary of the French group Omnium, has been officially dedicated in Mantua, north Italy. The plant is located on the left shore of Lago Inferiore, and is connected to the Adriatic Sea via the Mincio and Po rivers. Crude supply is made by barge service from Marghera (Venice) to Mantua, the distance being covered in about twenty hours.

The refinery has been completed in two years' work, on an area of 400,000 square meters. The cost has been over six billion lire ($10,000.000). The plants which compose the refinery, of 12,000 b/d capacity, are a combination topping-viscosity breaking unit, a Perco (Phillips) desulferization-reforming unit, a Phillips copper sweetening unit for gasoline and kerosine and an LPG recovery and fractionation unit.

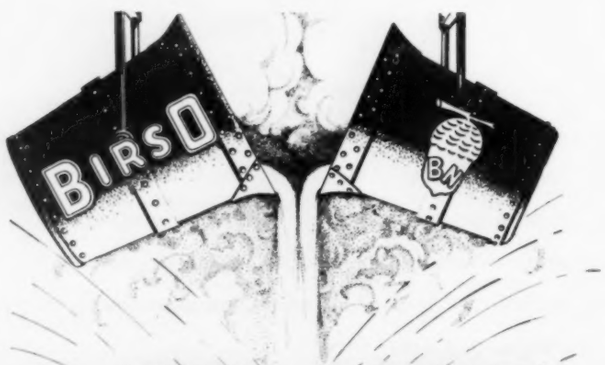
The scheme of operation of the refinery, at a crude run of 60,000 metric tons/year (12,000 b/d), will give the following products: motor gasoline (regular and premium), 160,000 tons; kerosene, 30,000 tons; gas and diesel oil, 170,000 tons; residual fuel, 210,000 tons; and LPGas, 9-10,000 tons.

The tank farm at the refinery has a capacity of 750,000 barrels and the marine terminal at Marghera is supplied with 160,000 barrels overall capacity. Refinery products will be marketed by the associated marketing company OZO.

Shell to Install Cracking Units

Cia. Shell de Venezuela has announced plans for construction at its Cardon, Venezuela, refinery of a catalytic cracking unit for production of highest quality aviation fuel. Another catalytic cracking installation is projected for the refinery of Curacaosche Petroleum Mij in the Netherlands West Indies.

These two additions to Shell's refining facilities in the Caribbean are estimated to call for an investment of over $56,000,000 and completion is set for late 1957 or early 1958.



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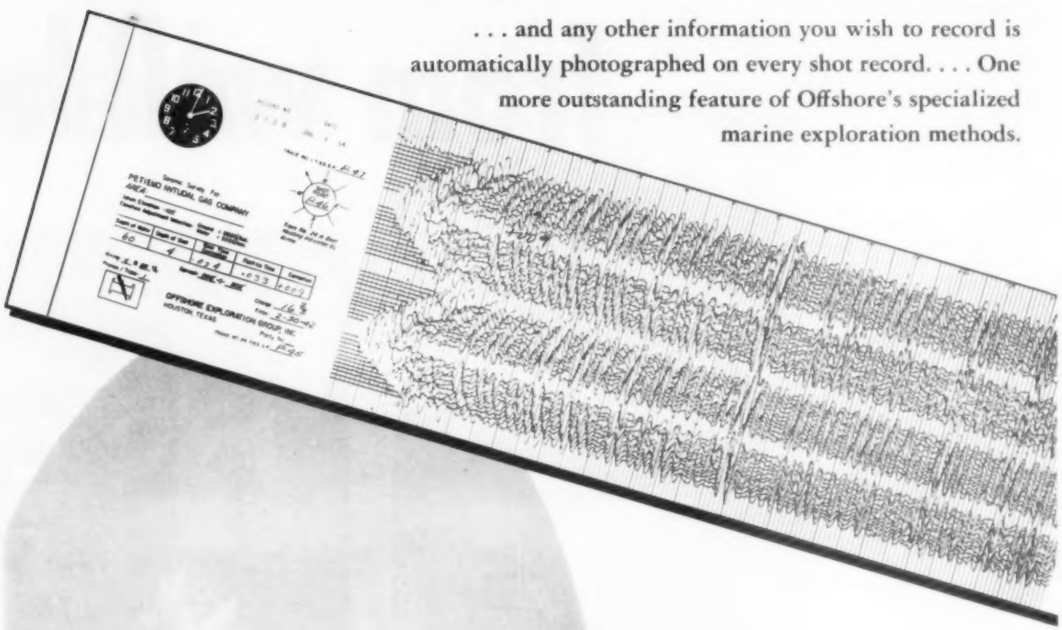

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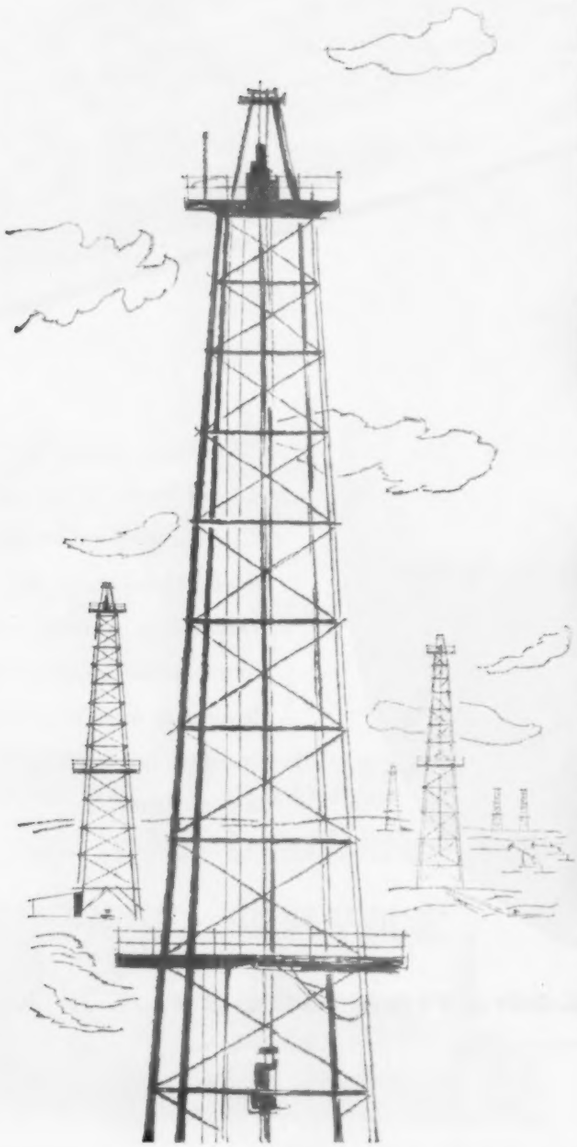

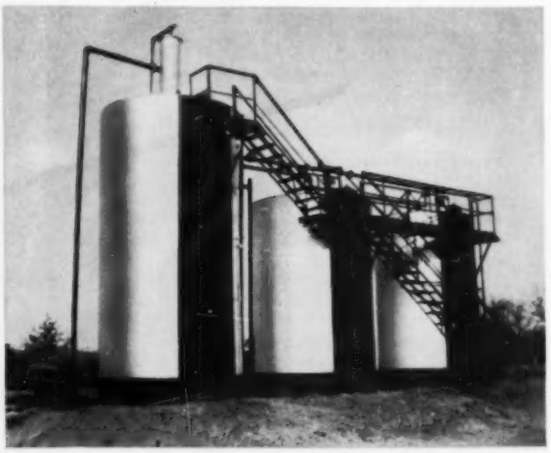

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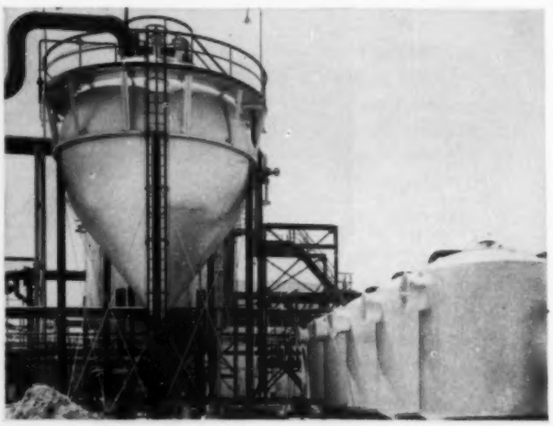
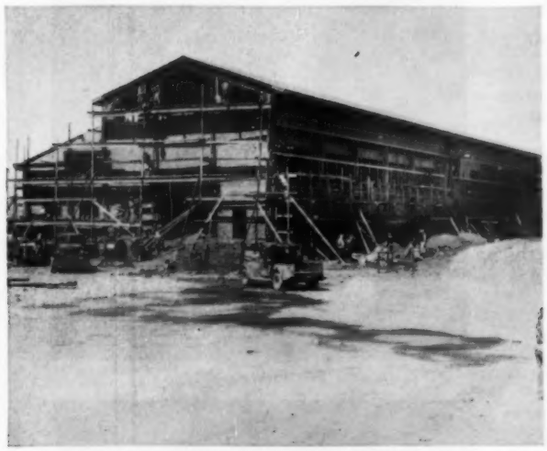


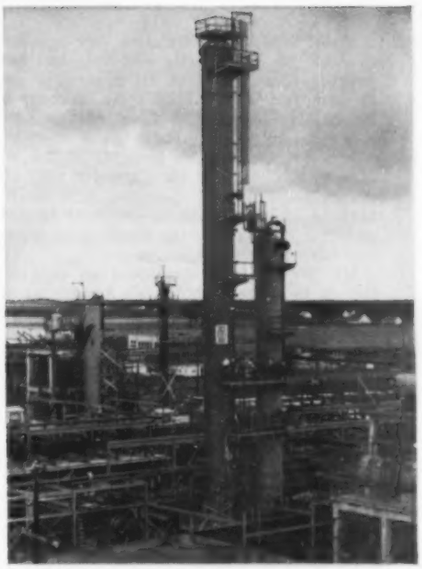
The Graver Sphericone Hot Process Softener, with or without hot zeolite after treatment, produces a safe boiler feedwater. GRAVER WATER CONDITIONING COMPANY also supplies standard hot process units and hot zeolite systems which can be added to existing hot process units.

Industry

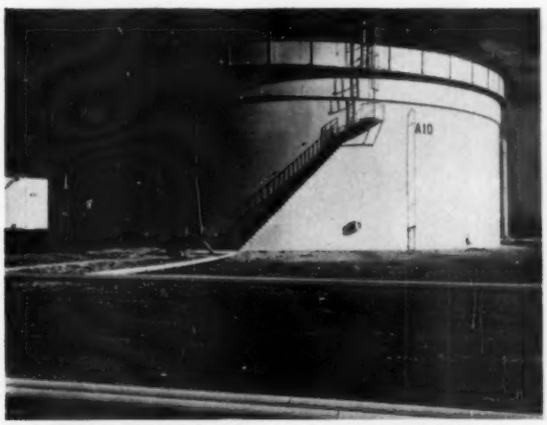
to market



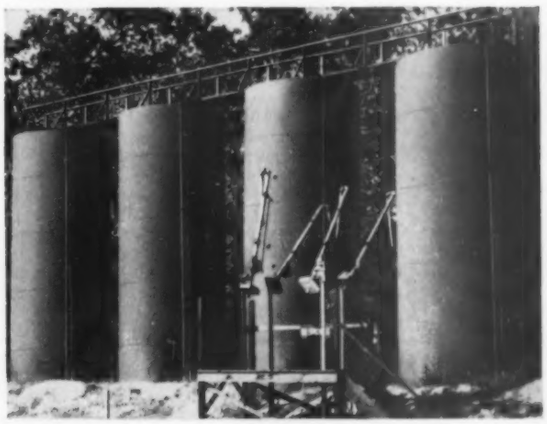
GRAVER CONSTRUCTION COMPANY designs, engineers, builds and maintains pipeline stations, refineries and other petroleum installations. *Guaranteed* customer satisfaction is a part of every Graver job.



GRAVER'S unequaled fabricating skill in steel and alloys is seen in the many towers and intricate process vessels constructed for the country's leading petroleum companies.



The GRAVER EXPANSION ROOF TANK represents the ultimate in modern conservation equipment. It is but one of Graver's many "tailor-made" designs that helps conserve petroleum products.



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OIL COMPANY STAFF CHANGES

G. W. WATTS, director of engineering for Standard Oil Co. of Indiana since 1945, has been named director of engineering and engineering research. He will remain at Standard's general office in Chicago. The general engineering department, which reports to him, will have offices at Whiting, Ind.

F. W. Schieneman, chief engineer, manufacturing, since 1951, was appointed manager of the reorganized general engineering department. G. M. Keranen was named the new department's assistant manager for construction, coordination, and contracts. W. G. Guild was appointed assistant manager for design engineering. Both have been assistant chief engineers, manufacturing—Mr. Keranen since 1948 and Mr. Guild since 1952. C. E. Evans, superintendent of the projects division at the Whiting refinery, was appointed assistant manager for project engineering.

The general engineering department will be stationed at the company's administration and engineering building at Whiting. The same building will house the Whiting refinery's own engineering division, with P. L. Krauel as chief engineer.

HOWARD S. McCRAY has been appointed manager of operations of The Texas Company's refining department. He was formerly superintendent of Texaco's refinery at Lockport, Ill. Other appointments announced by John S. Worden, vice president in charge of refining, include: Eddins W. McNealy, former superintendent at Eagle Point, Westville, New Jersey, was named superintendent at Lockport. Robert H. Aitken, former assistant superintendent at Eagle Point, was appointed superintendent.

Horace H. Chandler, former assistant superintendent of manufacturing at the Port Arthur, Texas refinery, was named assistant superintendent at Eagle Point.

THELL C. WOODS, formerly process superintendent of Deep Rock Oil Corporation's Cushing refinery, has been promoted to assistant to the vice president. Raymond Feasel, formerly fuels manufacture supervisor, succeeded Mr. Woods.

Quentin E. Benedict was promoted from lubricants manufacturing supervisor to assistant process superintendent. Thomas Coleman Jones, formerly shift supervisor, has been promoted to cracking plant foreman.

JOSEPH A. WINGER, manager of The Texas Company's 15-state central sales territory, has been named manager of operations of the domestic sales department. He will transfer from Chicago to New York. He succeeds H. W. Holland, who has been appointed assistant general manager, terminals. James M. Doss, assistant manager of the central territory, has been named to succeed Mr. Winger as territorial manager.

ROBERT C. McCAIN has joined Lion Oil Co. as geologist in the Casper, Wyo. district office, according to R. I. Williams, production ad exploration manager for Lion's Rocky Mountain Region. Mr. McCain was formerly a geologist with K. D. Owen.

ROBERT C. HARMS has been named acting mechanical superintendent at Tide Water Associate Oil Company's Bayonne, N.J., refinery. Mr. Harms joined Tide Water in 1946 as an engineer in the mechanical department.

LEO A. CASTLER has been appointed engineer in the engineering department of the General Petroleum Corporation. Mr. Castler, who joined the company in 1943 as a senior draftsman, will report directly to F. C. King, assistant manager at the Torrance (Calif.) engineering offices.

M. A. WRIGHT, executive vice president and director of The Carter Oil Co., has been appointed coordinator of all producing activities of Standard Oil Co. (N.J.). He succeeds the late Roger H. Sherman as head of the producing coordination department.

Mr. Wright took his first job in the oil business as a roustabout for Carter in 1933 after his graduation from Oklahoma A. & M. College. He became chief petroleum engineer in 1943 and assistant manager of the production department the following year.

Mr. Wright was appointed an executive assistant in Jersey Standard's producing department in 1946 and in 1949 was named deputy coordinator of producing operations. Two years later he was elected executive vice president of International Petroleum Co. Ltd., also a Jersey affiliate, and in 1952 was elected to his present position with Carter.

GEORGE M. CUNNINGHAM, American geologist, will visit Australia early in September to offer his advice in connection with oil drilling operations now being carried out by West Australian Petroleum Pty. Ltd., in the North-West Cape area. Mr. Cunningham, president of American Overseas Petroleum Ltd., exploration affiliate of the Caltex Group, will confer with WAPET officials on the progress made in geological and geophysical surveys and in exploratory drilling in Western Australia since his last visit in January.

Joining in the progress review will be officers of the Caltex Group. Ampol and Caltex, in partnership, own WAPET.

P. McDONALD BIDDISON, gas industry consultant and former vice president of Trunk Line Gas Supply Co., has been elected president of the Texas-Ohio Gas Company. He succeeds Frank Champion, who resigned as chief executive but remains as chairman.

The Texas-Ohio Gas Company's application to build a pipe line from south Texas to southeastern Ohio was denied in November 1952, but a court appeal is pending. The company also is considering filing a new application for a permit to serve other markets.

VERNON E. HOLMES has succeeded the late Walter L. McCloy, Jr., as superintendent, production operations of Sohio Petroleum Company at Billings, Mont. Mr. Holmes was formerly division superintendent of the Gulf Coast division.

RICHARD L. SAUNDERS, vice president and director of The Texas Company, has retired after 45 years in the company's service. He joined Texaco in 1909 as a voucher clerk in the New York offices. In 1929 he was made assistant to the general sales manager of the northern territory for the sales department. In 1935 he was appointed assistant general sales manager.

Mr. Saunders was named secretary of The Texas Company in 1938 and was elected a vice president in 1944. In February 1946 he was elected a director.

L. A. Castler

M. A. Wright

G. M. Cunningham

R. L. Saunders

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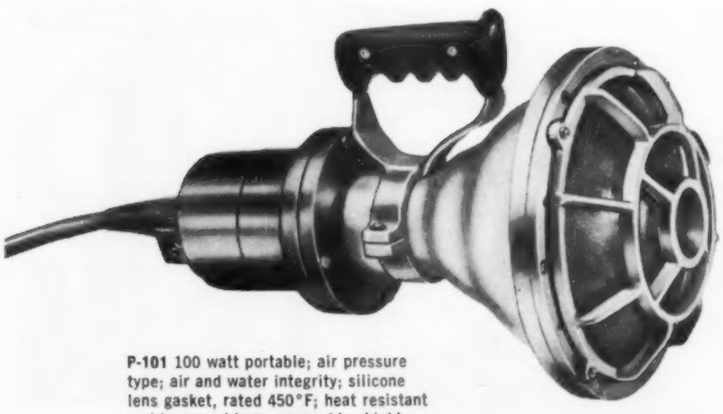

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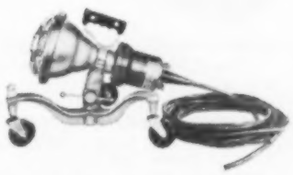

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R. K. Scales

Dr. G. F. Kirby, Jr.

J. B. Macauley

E. Bartholomew

RICHARD K. SCALES has been appointed the general manager of Detroit research laboratories of Ethyl Corp. and Dr. George F. Kirby, Jr., general manager of research and engineering at Ethyl's Baton Rouge manufacturing plant. Under a new organizational plan, all research programs in the automotive products field will be conducted at Ethyl's Detroit laboratories while research and engineering on chemical products and on manufacturing processes will be concentrated at Ethyl's manufacturing plant in Baton Rouge.

Mr. Scales was formerly director of automotive products research for Ethyl and Dr. Kirby was formerly director of research on chemical products.

John B. Macauley of the Detroit laboratories has been named director of technical coordination and will have the responsibility of coordinating technical relations with the oil and automotive industries. Earl Bartholomew will serve in an advisory capacity at the Detroit laboratories, specializing in the fields of engine, fuel and lubricant relationships.

M. J. DABNEY has been appointed to the newly-created position of coordinator of pipe line research at the Standard Oil Development Company. He has been connected with the Plantation Pipe Line Company in Atlanta since 1946, being engaged in research activities and general operations.

Mr. Dabney is a native of Atlanta and was graduated from Georgia Tech in 1936 with a degree in mechanical engineering. He studied electronics at Harvard and Massachusetts Institute of Technology while in the Navy during World War II. He was fighter operations director aboard the Hornet when the carrier was sunk off Santa Cruz in the Pacific.

MERTON E. AUSTIN of Mt. Pleasant, Mich., has been appointed division superintendent of the operating department for Sun Oil Company's Michigan production division, it has been announced by George W. Myers, division manager. He succeeds the late Clarence F. Knollenberg. George E. Haas succeeded Mr. Austin as division petroleum engineer.

N. B. MARVIS, assistant chief engineer for Continental Pipe Line Co., has been promoted to the newly created position of superintendent of Yellowknife Pipe Line Co., with headquarters in Spokane. He will direct operations of the new 540-mile Yellowknife line from Billings, Mont., to Spokane.

A. J. CROWLEY, has joined Continental Oil Co. as Rocky Mountain region research geologist, Denver. It was announced at the same time that T. R. Carpen has been promoted to division geologist for Conoco in Denver, succeeding J. H. Goth, Jr., who recently resigned.

JAMES W. FOLEY and **A. NEIL LILLEY,** vice presidents of The Texas Company, have been elected directors, it is announced by J. S. Leach, chairman of the board.

Mr. Foley joined the Texas Company in 1932 and has held a number of engineering and producing department positions. In 1950 he was named assistant to the chairman of the board, and in 1953 was elected a vice president.

Mr. Lilley, who is vice president in charge of foreign operations, eastern hemisphere, joined The Texas Company in 1933. He was elected a vice president in December 1951.

J. W. Foley

A. N. Lilley

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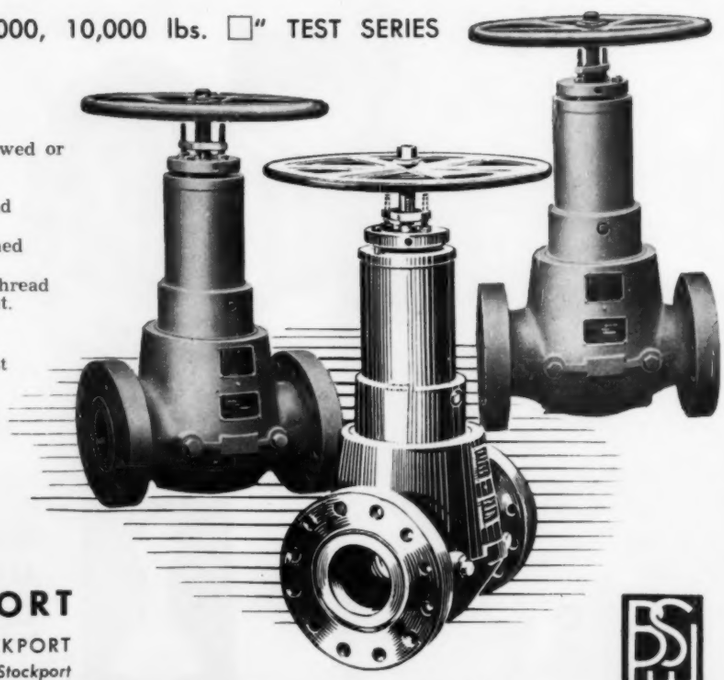

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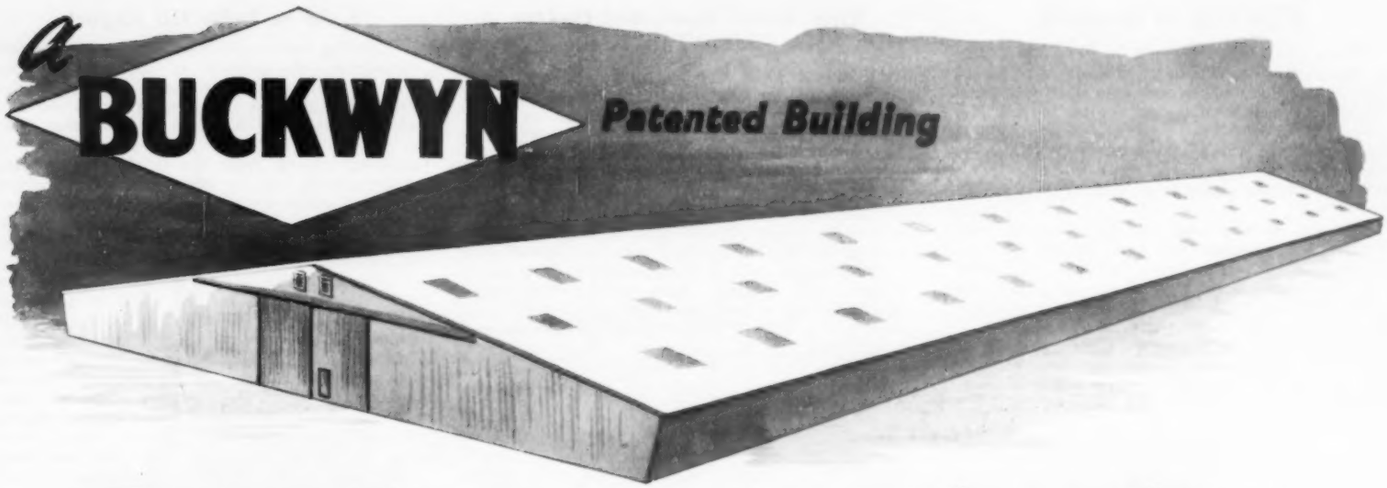

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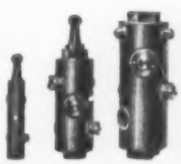

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High Cost of Research

Only one research project in 20 is brought to a financially successful conclusion, Dr. Gustav Egloff told members of the American Chemical Society at their meeting on September 14. The research director of Universal Oil Products Company said one of the world's largest companies estimates it spends four times as much on unsuccessful projects as it does on successful ones.

Nationwide expenditures for scientific and engineering research and development in 1952, latest year for which Labor Department figures are available, showed a 40 per cent increase over 1949 and totaled about 3.75 billion dollars, Dr. Egloff said. More than two and one half billion of this was for work done in facilities owned or operated by private business, including 1.1 billion for work done for the government.

Tide Water Associated Orders Two 45,000-Ton Tankers

Contracts have been signed between Tide Water Associated Oil Company and Mitsubishi Shipbuilding Engineering Co., Japan, for construction of two identical 735-foot, 45,000 dwt tankships.

Each ship will have a speed of 16.5 knots, draft of 36½ feet, will be powered by a steam turbine capable of developing 17,600 hp through its single propeller and will be able to carry a cargo of 300,000 barrels of petroleum products.

The tankers will be constructed at Nagasaki, Japan, with delivery date on the first ship within fifteen months and the second within a year and a half. The total cost will be about $10,000,000 for the two ships. They will be owned by Tide Water Tankers Ltd., a wholly-owned subsidiary corporation of Tide Water Associated Oil Company.

Gain in Lube Oil Exports

Speaking before the members of the National Petroleum Association at their fifty-second annual convention in Atlantic City September 15-17, President A. W. Scott pointed out that while the general trend in international trade in petroleum products is in the direction of lessened exports from the United States, sales of lubricating oils, in which many members of the association are particularly interested, are an exception. During the first six months of 1954, he said, exports of lube oils amounted to 7,450,696 barrels, a gain of 33 percent over the corresponding period of 1953. The explanation, he stated, is to be found in increased industrial activity throughout the free world, a movement that may be expected to continue.

Commenting on changes in the refinery set-up in the United States, Mr. Scott quoted Bureau of Mines statistics to show that while the refining capacity of the country had approximately doubled since 1940, rising from slightly over four million barrels daily to a little more than eight million, the number of operating refineries had declined from 547 to 337 during the same period, a drop of 38 percent. He pointed out that the concentration of the industry in fewer units of much greater size ran counter to government plans for the disposal of essential industries and increased their vulnerability to possible atomic attacks.

Aurora to Build Fluid Coker

Aurora Gasoline Co. has announced plans to build a fluid coker, sulfur recovery plant and Unifining plant at its Detroit refinery to cost $4.5 million. The fluid coker will have a design capacity of 4,000 barrels per day of heavy vacuum reduced crude. Coke production will amount to 100 tons per day. The new Unifiner is the first desulfurization unit of this type to be designed to process heavy vacuum oil. Design capacity is 7,500 barrels per day. Hydrogen requirement will come from Aurora's 6,000 b/d Platforming unit.

A construction contract has been let to the Ralph M. Parsons Co. of Los Angeles for the three units and their related appurtenances. A second construction contract has been let to Procon, Inc. for the immediate construction of a new 14,000 b/d fluid catalytic cracking unit. It will be a so-called off-set unit, the reactor being separately supported. The new unit will more than double Aurora's catalytic cracking capacity. Immediate plans call for a high conversion operation charging 14,000 barrels of gas oil daily. Completion in 1955 is planned.

Oil Well Pumping Starter

A new oil well pumping starter featuring a gasketed enclosure and ventilated overload relay compartment has been announced by the general purpose control department of the General Electric Co. The starter enclosure is sealed with a neoprene gasket to prevent entrance of dust or rain, but at the same time, a separate ventilated overload relay compartment helps prevent relays from tripping due to heat from the sun. An external reset button permits resetting relays without opening the sealed main starter enclosure.

The timer on the new oil well pumping starter is designed for programming on a 24-hour basis. Also available is a sequence restarting timer for staggering the return of wells to service after power shutoff.

Standard-Sinclair Ammonia Plant

Standard Oil Company (Indiana) and Sinclair Refining Company are jointly erecting one of the largest ammonia plants in the midwest. The plant will be built in Hammond, Indiana, near Standard's Whiting refinery and Sinclair's East Chicago refinery. Both refineries will feed by-product hydrogen and other gases into the plant by pipe line. The hydrogen will be combined with nitrogen from the air to produce 300 tons a day of anhydrous ammonia. The plant will be the largest in the country producing anhydrous ammonia from by-product hydrogen. It will also be able to produce solutions of ammonia and ammonium nitrate.

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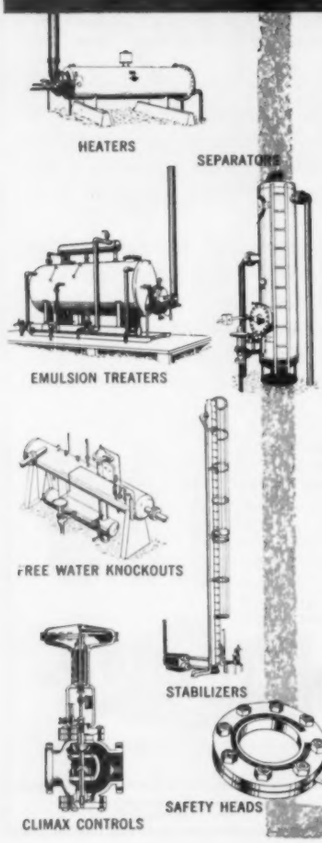

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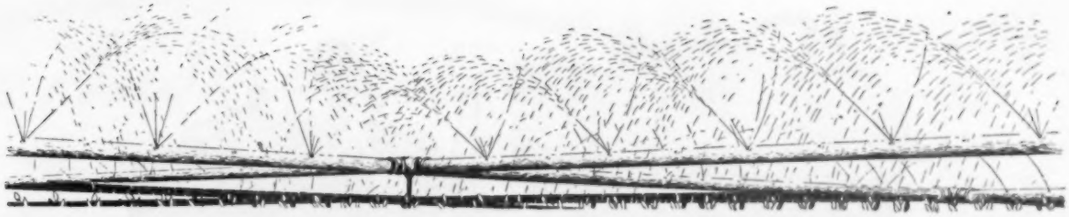

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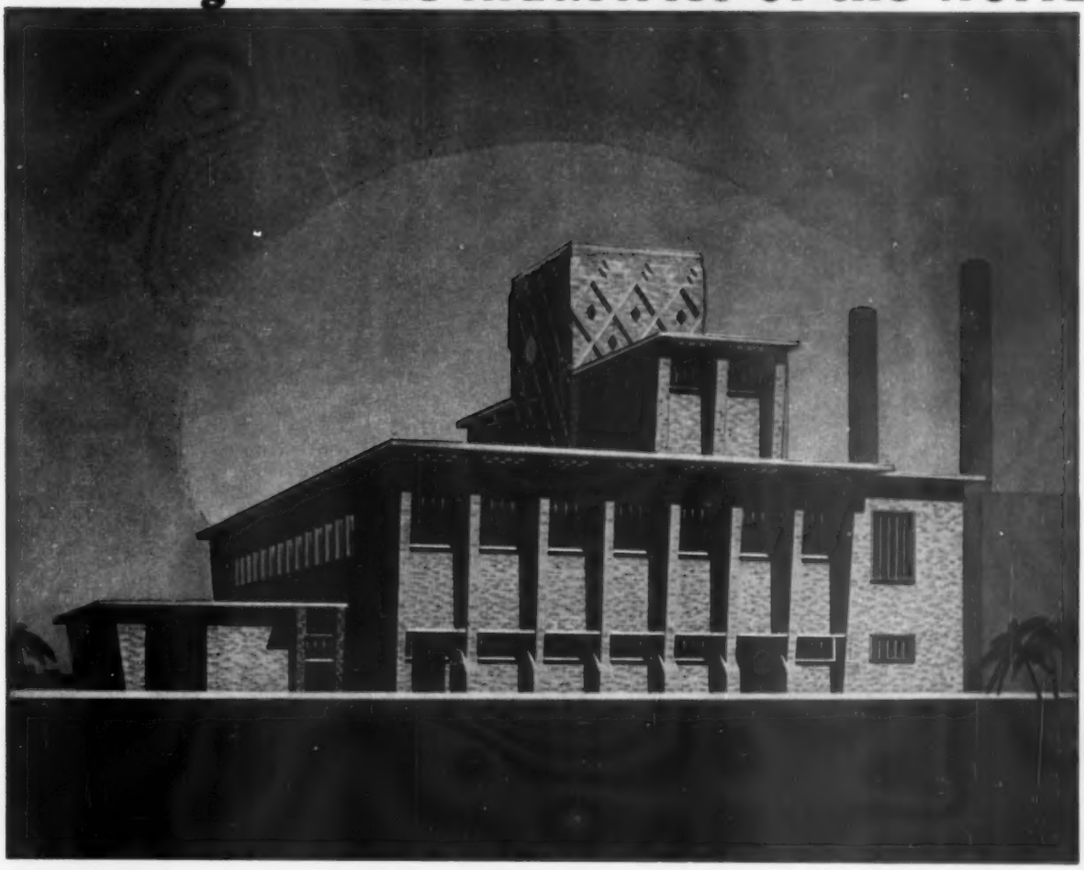

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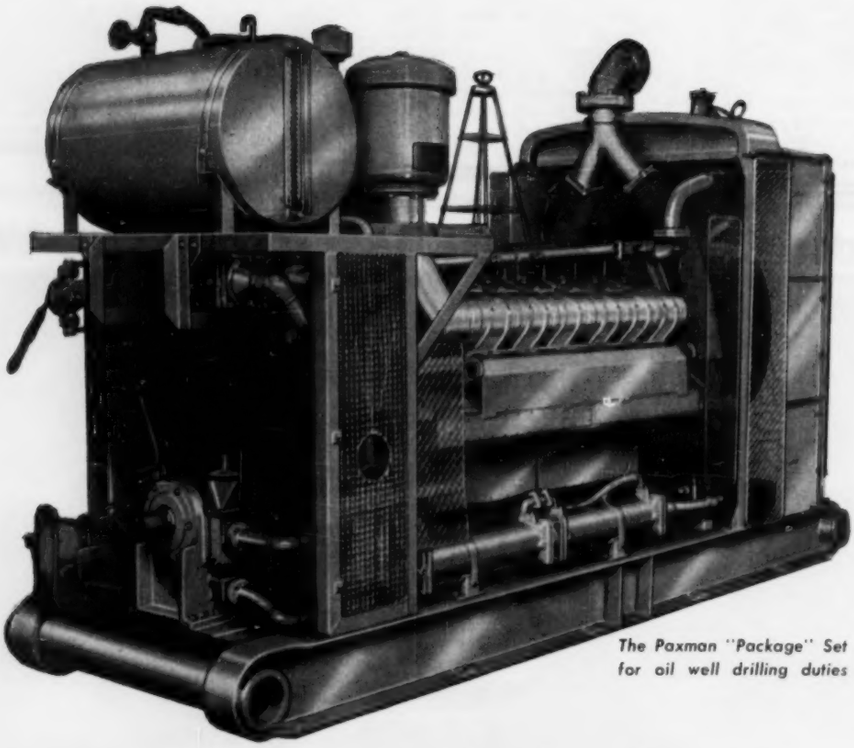

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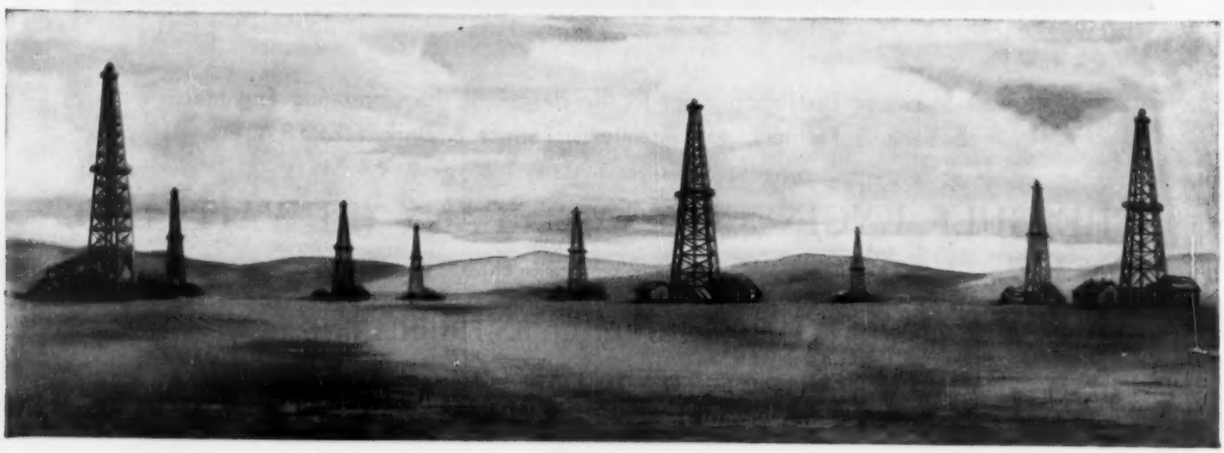
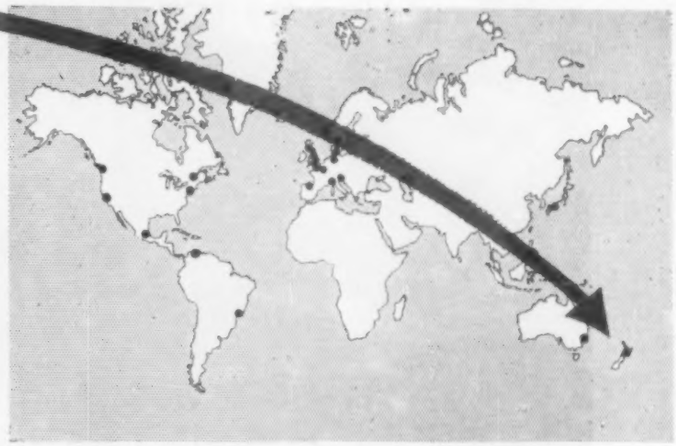


International Paints

in Australia



At Sydney an associated "International" factory is making paints for a great variety of purposes. Their intimate understanding of paints suitable for the Australian market contributes in no small measure to the wealth of knowledge accumulated by "International's" world-wide organisation.

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WIMPEY AT ADEN

AERIAL VIEW SHOWING THE OIL HARBOUR AND PORT INSTALLATIONS
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Consulting Engineers: Messrs. RENDEL, PALMER & TRITTON

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G. M. Parker

GEORGE M. PARKER has been elected president of Esso Export Corp., succeeding William J. Haley, who retired October 1. Mr. Parker, who became executive vice president of Esso Export in 1953, has been with the Jersey organization for 26 years. Mr. Haley joined the company as an engineer at the Bayway, N.J., refinery 40 years ago. His work has since taken him through refinery management to executive positions in overseas and domestic operations.

In his new capacity, Mr. Parker also becomes president of Mediterranean Standard Oil Co. as well as three other newly-formed Jersey affiliates: Staniraq Ltd., Mediraq Ltd. and Esso Trading Co. of Iran.

Mr. Parker was elected a vice president of Esso Export in 1950 when he took over as the company's senior representative in Europe. Previously he had served Jersey as advisor on marketing operations in Latin America and later as marketing advisor for the United Kingdom, Europe, North Africa and the Near East.

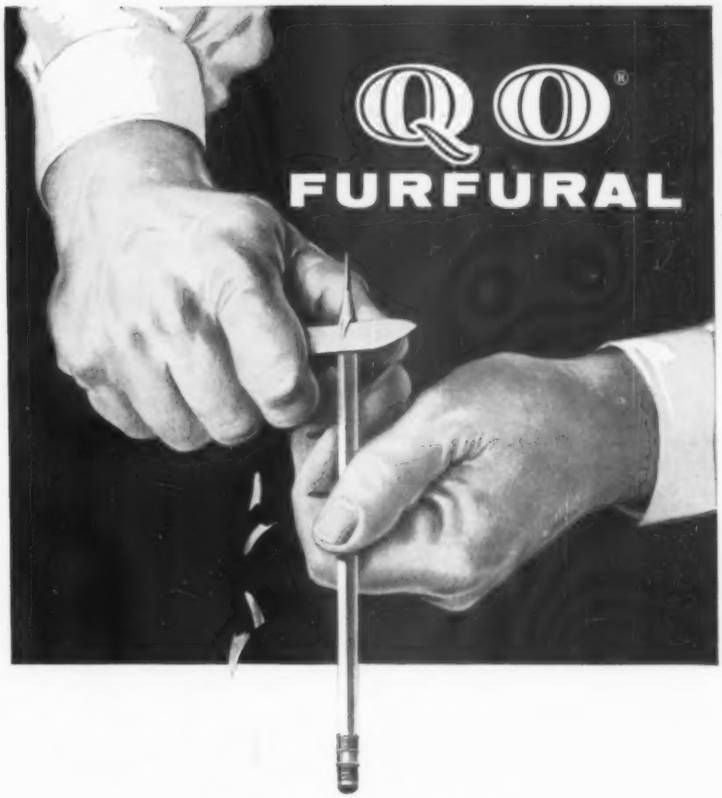
Mr. Parker has been a director of the Liquefied Petroleum Gas Association and chairman of the Industrial Section of the American Gas Association. During the last war he was an advisor to the War Production Board. In the First World War he was in the U. S. Navy and later an officer in the United States Army Air Corps.

Mr. Haley served in executive capacities at refineries in Baton Rouge, La., Charleston, S.C. and Havana, Cuba, and in 1944 became coordinator of foreign refining activities. In 1947 he was named coordinator of Jersey Standard's worldwide refining operations. He became president of Esso Export Corp. in 1950.

In this capacity, Mr. Haley undertook the complicated task of guiding Jersey Standard's international sales in a world beset with a maze of currency exchange problems. By buying supplies and equipment for Jersey affiliates and selling crude and products in international markets, he was successful in turning soft currencies into the goods of various nations that were short of dollars and then frequently reselling the merchandise to the affiliates that could provide the oil for dollars. In addition to easing the dollar problem for soft currency nations, Esso Export also located equipment, such as pipe, not readily available in the United States because of the heavy post-war demand for steel.

During World War II, Mr. Haley was chairman of the Caribbean Area Petroleum Committee, charged with meeting fuel demands of the Armed Services in that area. In the First World War he was with the U. S. Navy.

HOMER Z. MARTIN, assistant director of the development division of Standard Oil Development Co., has been transferred to the research division as assistant director for one year on a rotational assignment. During this period of assignment Arnold F. Kaulakis and Henry J. Ogorzaly will in turn assume Dr. Martin's responsibilities in the development division.



has caught the Petroleum Industry's quick eye for value

In 1933, QO furfural caught the eyes of the petroleum industry. It was then that the first refinery began using this solvent for making high quality lubricating oil. Since then many refineries have adopted furfural, 24 new units having commenced operation within the last 5 years alone.

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Write for more facts about furfural, available in Bulletin 203 "Physical Data on Furfural," and Bulletin 204 "Current Uses of Furfural."

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The oil rig is going to sea—and the versatile Bell helicopter is going with it. The search for oil has extended to the bottom of the ocean and drilling rigs are springing up miles from shore.

Quick, safe, dependable transportation for men, supplies and equipment to these floating operations posed a major problem to oil and drilling companies.

The probem was easily solved. Bell helicopters, *equipped with floats,* are providing the answer for many operators. Heavy equipment is moved via boat and barge but key personnel, supplies and vital repair parts are speeded to off-shore rigs in reliable Bell helicopters.

Low operation and maintenance cost, plus more than a million flight hours, makes the Bell helicopter the best vehicle for off-shore work, where lost minutes mean thousands of lost dollars.

Bell helicopters enjoy a record of economically sound performance in the petroleum industry—*on shore and off shore.* We'd like to show you how this experience can benefit your company. For complete details—including the names of helicopter operators in your area—wire or write:

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H. G. Vesper *A. L. Lyman*

H. G. VESPER has been made director of marketing, supply and transportation for Standard Oil Company of California in the western area, including Alaska and Hawaii, the company announces. Mr. Vesper has been a vice president of Standard since 1952 and has been president of California Research Corporation, a subsidiary, for the past eight years. He is being succeeded in the latter position by A. L. Lyman, who has been executive vice president of the research company.

After graduation from California Institute of Technology, Mr. Vesper went to work for Standard in 1922 at the company's El Segundo refinery, first in research and development and then in marketing, being named manager of gasoline and fuel oil sales in 1942.

Mr. Lyman joined Standard in 1924, following graduation from the University of California. He became manager of the company's Richmond laboratories in 1938 and a director of California Research in 1944. He became executive vice president in 1953.

P. H. HOLT, an assistant director of the Esso Laboratories research division, has been placed in charge of patent licensing activities of Standard Oil Development Co. Dr. Leonard E. Carlsmith will be responsible for technical advice and contracts with licensees, contractors and engineering units of the company.

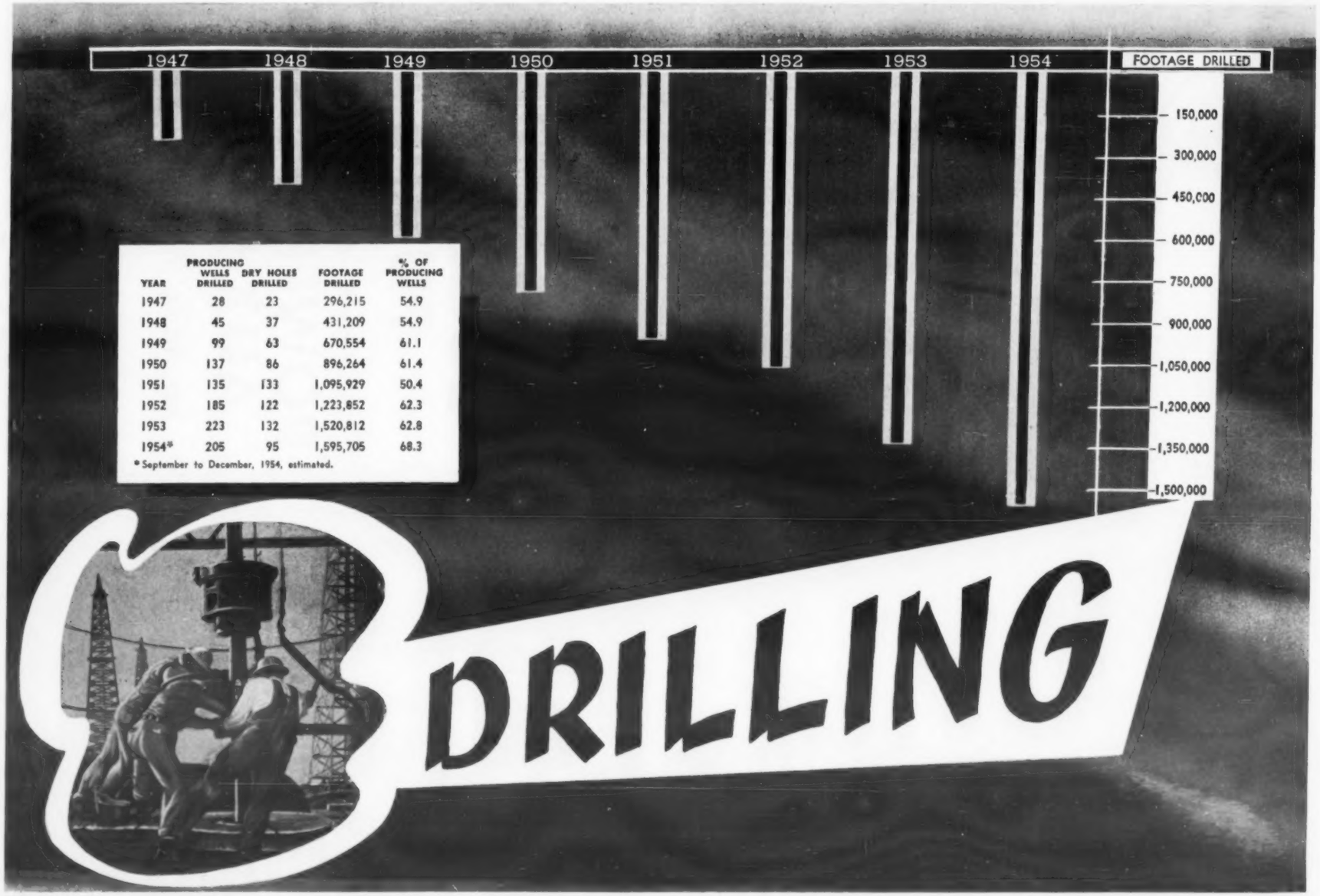
New emphasis is being placed on this phase of the firm's worldwide operations in view of the increasing number of major petroleum processes and inventions it has developed recently, including fluid coking, fluid hydroforming, hydrofining and new versions of the fluid catalytic cracking technique.

O. F. MOORE, who in his career of nearly 45 years with the Ohio Oil Co. advanced from stenographer to a director and vice president in charge of the company's extensive supply and transportation activities, retired September 1. He was succeeded by John R. Donnell, assistant manager of the supply and transportation department.

Mr. Moore joined Ohio in 1909 and became assistant secretary of the Illinois Pipe Line Co. and vice president in 1938. He became a director and vice president of the parent company in 1946.

Mr. Donnell joined Ohio in 1936 as a special representative in the executive offices, Findlay, performing a wide variety of duties. In 1944, he became assistant to the manager of production, and in 1950 was elected treasurer of the company. He served as treasurer until January 1 this year, when he was appointed assistant manager of the supply and transportation department.

O. F. Moore *J. R. Donnell*



YEAR	PRODUCING WELLS DRILLED	DRY HOLES DRILLED	FOOTAGE DRILLED	% OF PRODUCING WELLS
1947	28	23	296,215	54.9
1948	45	37	431,209	54.9
1949	99	63	670,554	61.1
1950	137	86	896,264	61.4
1951	135	133	1,095,929	50.4
1952	185	122	1,223,852	62.3
1953	223	132	1,520,812	62.8
1954*	205	95	1,595,705	68.3

* September to December, 1954, estimated.

DRILLING

PETROLEOS MEXICANOS

Gas Regulation Step Toward Full Price Control

"For 16 years, federal authority has encroached step-by-step into the domain of natural gas production," said J. C. Donnell II, president of Ohio Oil Co., speaking before the Texas Midcontinent Oil and Gas Association on October 6. "Now, unless the Natural Gas Act is amended, independent producers must submit to an act designed to apply to public utilities. It matters not that the business of producing and selling gas has none of the characteristics of a public utility, nor that natural gas producers have no desire to become public utilities. The Supreme Court has held that the act regulating interstate transmission companies compels the Federal Power Commissions to regulate field sales of natural gas entering interstate commerce, and this is true even though the act specifically exempts production and gathering.

"While the effects on the supply-demand balance of natural gas would be the primary and more obvious results of public utility regulation, one would be naive, indeed, not to foresee the imminent extension of federal regulation to all local sales of natural gas which might effect interstate commerce and, in time, to petroleum, with which gas is so closely associated.

"The regulation of competitive prices in oil and gas production would be a radical departure from the basic principles of the nation. Such regulation is nothing but out-and-out price control, and a perpetuation of the functions of the late and unlamented OPA.

Indiana Standard Splits Stock

Directors of Standard Oil Company of Indiana, in addition to a regular quarterly dividend of 62½ cents per share, declared a 100 percent stock dividend in shares of its own stock. Both are payable on December 1 to stockholders of record on October 25, 1954.

Heads Axelson Advertising

Bruce E. Ellithorpe has been appointed director of advertising and public relations of Axelson Manufacturing Company. He will be responsible for Axelson's four divisions: petroleum equipment, lathes, aircraft components and foundry. He was formerly with Grant Advertising Agency in Chicago and New York City.

Survey of Hydrocarbon Chemistry

A symposium on hydrocarbon chemistry is announced by Southeastern Texas Section, American Chemical Society, to be held in Houston, Texas, January 27 and 28, 1955.

The program will consist of papers by invited speakers representing outstanding authorities from the United States and Canada.

A dinner meeting will be held on January 27 at the Rice Hotel, headquarters of the symposium. The detailed program will be published later in the year.

Dr. Ahlborn Wheeler Joins Houdry

Dr. Ahlborn Wheeler, international authority on the chemistry of catalysis, has joined the research staff of Houdry Process Corp. As a member of the fundamental research division, he will study the catalytic activation of hydrogen. Dr. Wheeler formerly worked for Shell Development Company, where with the late Dr. Otto Beeck he studied the catalytic properties of evaporated metal films. Since 1946 he has been with the polychemicals department of du Pont, studying catalytic hydrogenation and reaction rates in catalyst pores.

Heads Fluor Research

Dr. William R. Hainsworth has been appointed vice president in charge of the research division of The Fluor Corporation Ltd., Los Angeles. He has been technical advisor to the executive vice president since 1952. He was formerly vice president of the engineering division for Servel, Inc., and is a past chairman of the Industrial Research Institute.

B. E. Ellithorpe

Dr. W. R. Hainsworth

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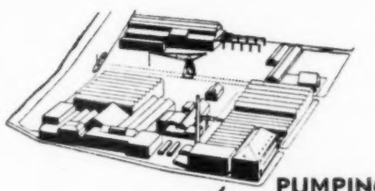

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SAMUEL OSBORN & CO., LIMITED
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Humble Oil & Refining Company's new Houston research center will be formally dedicated this week to continuing research in geophysics, geology, drilling and production. Some 330 scientists, technicians, and assistants who formerly worked in separate locations will now carry on their research in this one center. The two buildings in the center contain more than 300 laboratories, shops, and offices furnished with the newest scientific equipment.

Gulf Coast Geologists to Meet

The Gulf Coast Association of Geological Societies will hold its fourth annual meeting November 3 to 5 at the Rice Hotel in Houston. Members of the recently organized Gulf Coast Section of the S.E.P.M. have been invited to take part in the meeting for the first time. The Houston Geological Society will be host group.

Lewis B. Weeks of Standard Oil Co. (N. J.) will give the keynote address at the opening session. His topic will be: "A Geologist Takes Stock." R. R. Rieke of Schlumberger Well Surveying Corp. is general chairman of the meeting. W. R. Canada, Magnolia Petroleum Co., will serve as program chairman, with Lloyd D. Traupe, The Ohio Oil Co., as co-chairman.

Dedicate Humble Research Center

Humble Oil & Refining Co.'s Houston Research Center, containing more than 300 laboratories, shops and offices in two buildings on a 15-acre tract in the southwest section of the city, was dedicated September 11. The center was opened for public inspection.

Research in the new Houston center is concentrated on exploration and production problems. Product and refining research is carried on at the company's Baytown research center, opened in 1951 to consolidate research activities at Baytown refinery.

Humble now has almost 600 employees devoting full time to a broad research program which costs between $5 and $6 million per year.

Explosion-Proof Lighting Units

Safe Lighting, Inc., has developed what are reported to be the only explosion-proof lighting units ever to be approved for use in hydrogen areas. These units operate with a self-contained air pressure which eliminates all breathing and seepage of gases which can cause interior explosions. Many inspection engineers have characterized this development as the first important advance in explosion-proof lighting in a quarter of a century.

Catalytic reforming processes all require the use of hydrogen gas, which is classified by the National Electric Code as a Class I, Group B hazard. Heretofore, no lighting unit has ever received an approval higher than Class I, Group C; in only a few cases has approval been given beyond Group D.

The Standard Oil Development Co. has specified these new air pressure fixtures for all Hydro-fining units licensed by them, and Universal Oil Products Co. has similarly specified them for their Platformer units. Most other major oil companies have specified or are specifying these lighting units for all hydrogen and other highly hazardous locations.

Geomarine Moves to New Orleans

Operational headquarters of Geomarine Service International, Inc., offshore exploration division of GSI, moved from Dallas to New Orleans September 7. Office address in New Orleans will be 512 Carondelet Bldg.

Neil W. Mann has been made manager of Geomarine, replacing Curtis H. Johnson, who has been transferred to Holland as resident director of Geophysical Service (Nederland) N. V. Mr. Mann has been assistant manager in the Geomarine Dallas office.

New Conoco Petrochemical Laboratory

Continental Oil is building a $500,000 research laboratory building at Ponca City, Okla., from an 80,000-barrel oil storage tank. The insulated, air conditioned tank will provide petrochemical pilot plant facilities. About 60 additional research workers will staff the new laboratory.

The new building will be three stories high, with a center well "like the hole in the doughnut." Suspended from the ceiling above the "doughnut hole" will be a travel hoist to handle pilot plant equipment and experimental apparatus.

Each of the three floors encircling the "hole" will contain offices, special laboratories and utility and conference rooms, facing the well area. The three floors will provide 33,000 square feet of floor space.

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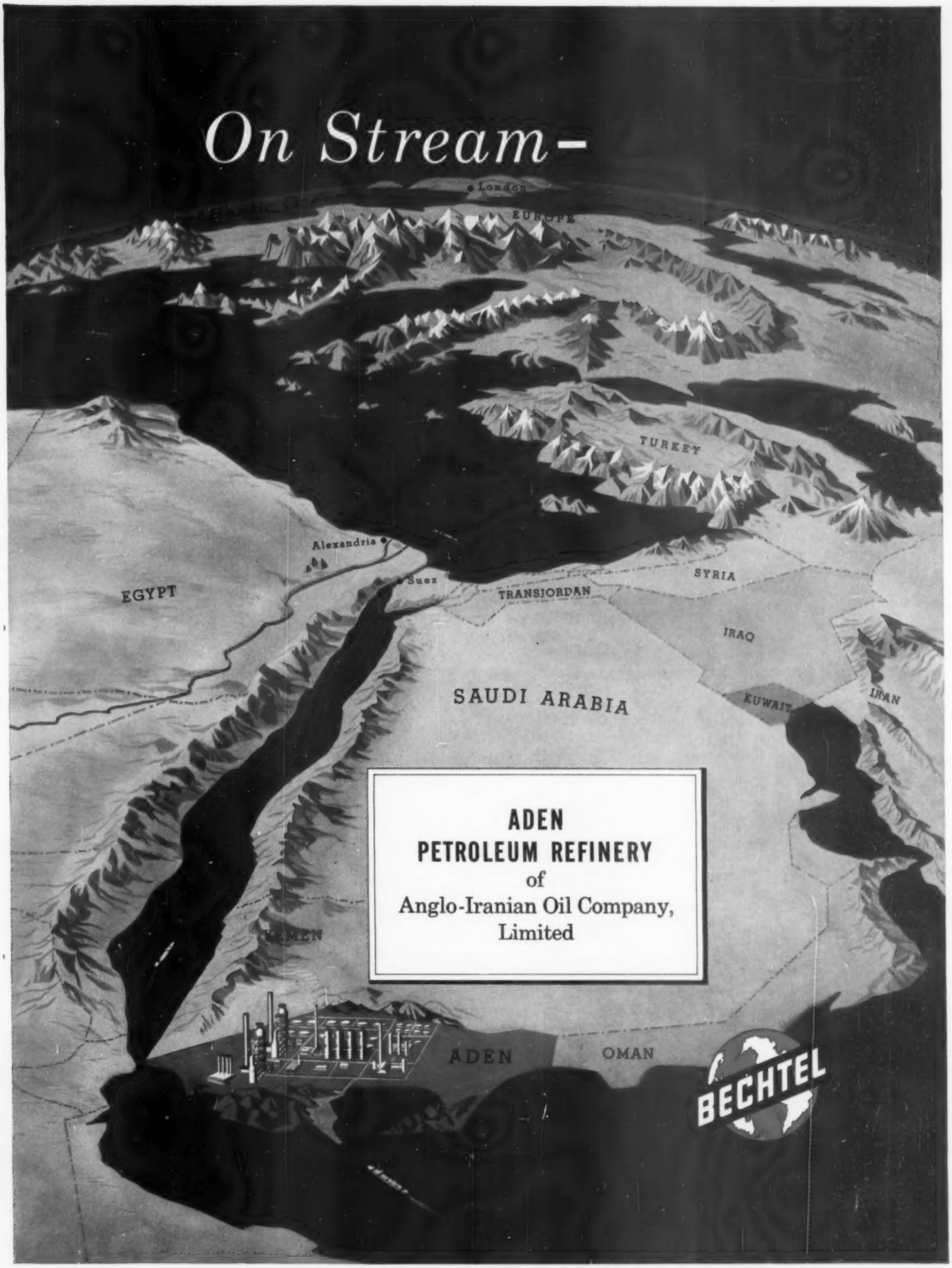
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A Great Refinery Goes Into Service

The new Anglo-Iranian Oil Company Refinery at Aden is in operation – a strong link in the growing chain of BP facilities that extend from the United Kingdom to Australia.

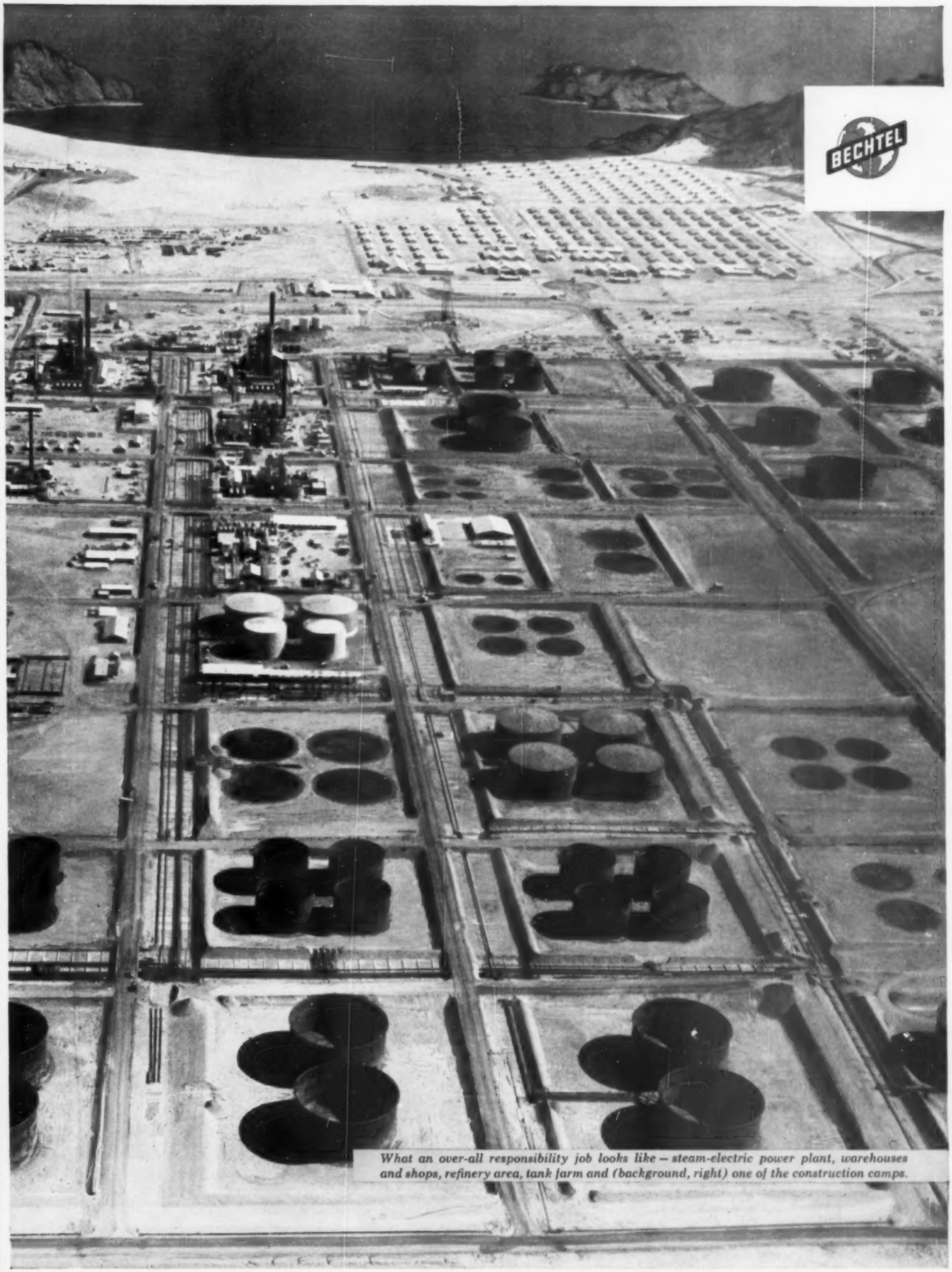
The refinery will serve East Africa, the Middle East, India, Pakistan and Ceylon with essential petroleum products, and will manufacture marine fuels for ships bunkering at the thriving Port of Aden.

Two key facts emphasize the importance of this new plant among the world's refineries:

- ... capacity of 120,000 barrels per stream day (5 million tons of crude oil per year)
- ... a strategic location at the crossroads of the main east-west sea routes.

Responsibility for the design, engineering, materials and equipment procurement, and construction of the refinery was placed with the Bechtel organization, which worked closely with the Anglo-Iranian technical staff at all project stages. George Wimpey & Co., Limited, was an associate.

BP



What an over-all responsibility job looks like – steam-electric power plant, warehouses and shops, refinery area, tank farm and (background, right) one of the construction camps.

On July 29th when the Aden Petroleum Refinery went into commercial production, less than 21 months had elapsed from the day when a small corps of construction specialists—forerunners of an eventual force of 14,776—arrived at the site.

21 Active Months

In that short period of time a large diversified refinery was built on a barren peninsula thousands of miles from any industrial center, and brought into production substantially ahead of schedule. A major oil port was engineered and constructed by George Wimpey & Co., Limited, with whom Bechtel was associated on the Aden project.

Simultaneously from bases at jobsite, in London and in the United States, specialists in a coordinated program established process designs; performed engineering, transported supervisors overseas; assembled, fed, housed and kept an international team of Bechtel-Wimpey workers healthy and happy; purchased, expedited, inspected and delivered shiploads of materials and equipment; and constructed the refinery, its utilities, roads, buildings, and other appurtenances.

The Aden Petroleum Refinery is an illustration of integrated Bechtel engineering-procurement-construction service in action. It is available—as a complete "package" or in essential parts—anywhere, at anytime.

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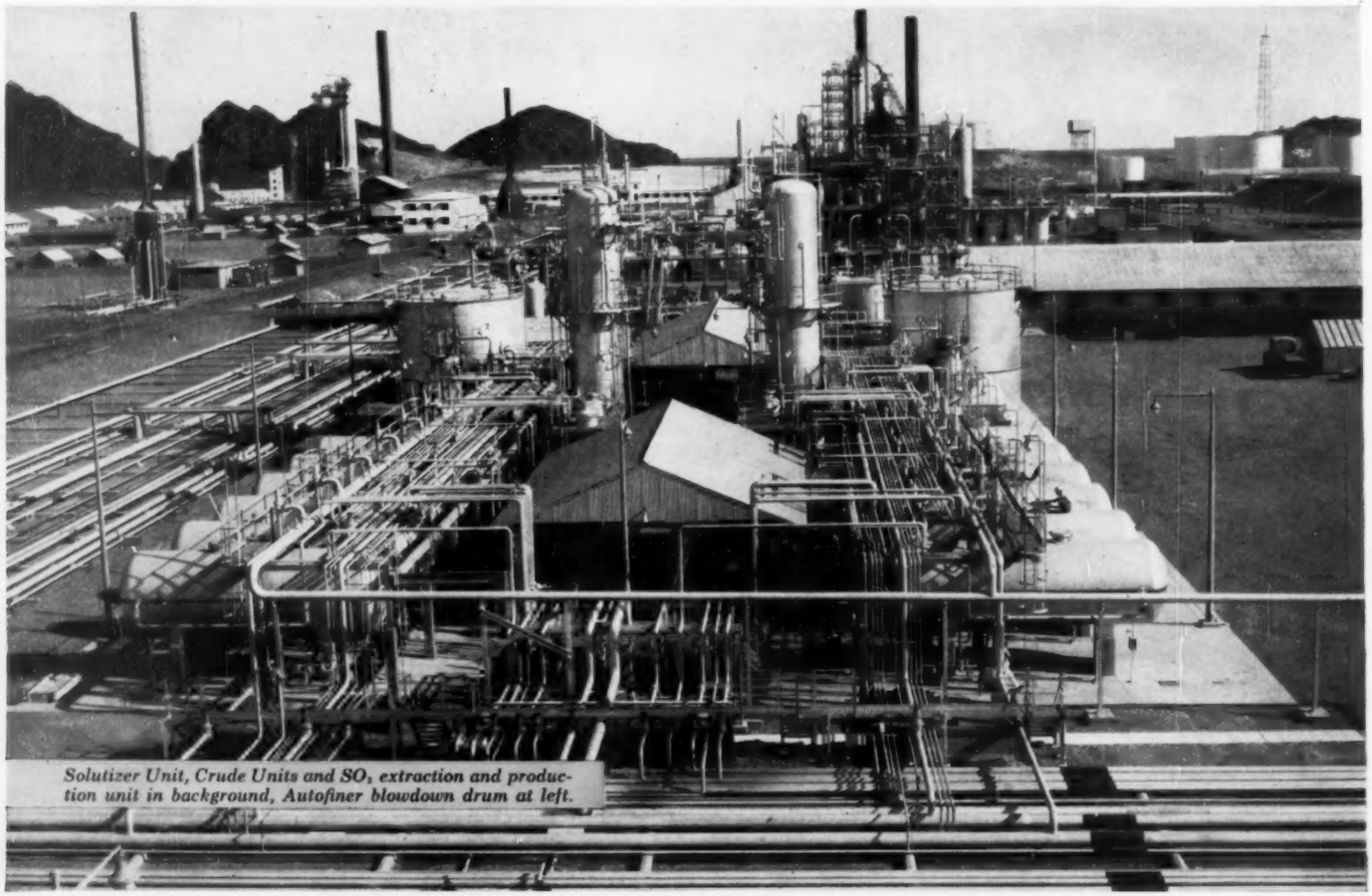

Solutizer Unit, Crude Units and SO_2 extraction and production unit in background, Autofiner blowdown drum at left.

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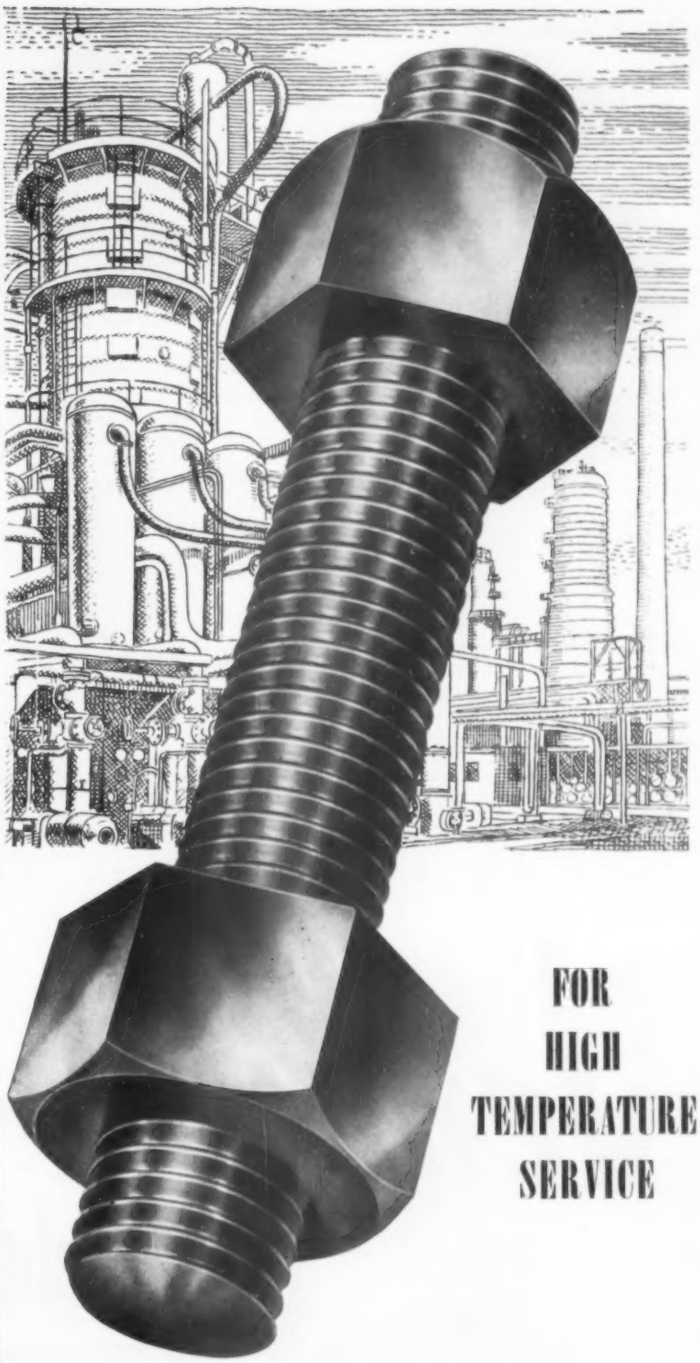

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Magnolia Buys 24-Passenger Crew Boats

Magnolia Petroleum Company has commissioned three new crew boats purchased from Todd Shipyards Corp. to service offshore rigs. Each vessel is 65 feet long, with a cruising speed of 14 miles per hour and passenger capacity of 24.

The passenger saloons on the vessels are designed for comfort and convenience and feature 12 double reclining seats with luggage racks overhead. The over-all effect resembles the interior of a modern train or bus. Crew accommodations provide a berthing area forward for four and a galley and mess compartment aft.

Vessels are of all-welded construction with ¼-inch hull plating and 3/16-inch decks and bulkheads. There are five transverse watertight bulkheads forming six watertight compartments. Propulsion is supplied by two Buda 300 hp diesel engines. Starting air and air for controls are supplied at 150 psi by two 1-hp Gardner Denver air compressors. Full control of the vessel is from the pilot house, where Westinghouse air brake throttle and clutch control are installed. The twin-rudder steering is manual. All auxiliaries are electric, served by power from two Buda diesel-driven generators, 120 volts, 12.5 kva, 60 cycle. Heat for quarters is supplied by Electomode space heaters of 1½ kw capacity each. A Viking 90 gpm rotary fire pump operates from a power take-off from one of the diesel generating units.

Rockwell Promotes T. O. Carson

Thomas O. Carson, manager of Rockwell Manufacturing Company's international division at New York City for the past five years, has been promoted to assistant product manager, Nordstrom Valves. He will make his headquarters at Pittsburgh. Mr. Carson joined Rockwell as a sales engineer in the international division in 1945 and traveled extensively through Mexico, Puerto Rico, Cuba, Venezuela, Colombia and Canada.

R. E. White *C. O. Bartley*

Mission Makes Appointments

Appointment of Richard E. White as general manager and Charles O. Bartley as works manager of Mission Manufacturing Company has been announced by Dudley C. Sharp, Mission president.

Mr. White started with the company as a junior engineer and rose to plant superintendent in 1942. He served with the U. S. Navy during World War II and upon his return was named production manager, becoming works manager in 1948.

Mr. Bartley joined Mission in 1941 and became production superintendent in 1949. During World War II he was a lieutenant in the U. S. Navy.

Sun to Build Houdriflow Unit

Sun Oil Co. will build a 27,000 b/d Houdriflow cat-cracker at its Toledo refinery. The moving-bed cat-cracker will completely replace the Houdry fixed-bed units which have been in service since 1939. The unit is being engineered by Houdry Process Corp. and Sun Oil Co. Construction contracts have been awarded to Catalytic Construction Co. Completion of the Houdriflow unit is scheduled for early 1955.

Huber Heads OIIC for 1955

W. R. Huber, general manager of public relations for Gulf Oil Corporation, was elected chairman of the Oil Industry Information Committee for 1955 at a meeting in Chicago Sept. 10. Mr. Huber has been a member of the Information Committee since its inception in 1947. During the past three years he has been chairman of the subcommittee on advertising. He will take office in December, succeeding G. Stewart Brown, manager of public relations for Standard Oil Company of California.

The following vice-chairmen were elected: J. H. Sembower, Shell Oil Co., San Francisco; Roy M. Stephens, Humble Oil & Refining Co., Houston; L. R. Kamperman, Leonard Refineries, Alma, Mich.; Kerryn King, The Texas Co., New York; and Richard Rollins, Atlantic Refining Company, Philadelphia. John S. Cooke of the American Petroleum Institute, N. Y., was re-elected secretary.

NPA Reelects Officers

At the fifty-second annual convention of the National Petroleum Association, held at Atlantic City, N.J. September 15-17, the entire board of officers, headed by A. W. Scott, president of Wolf's Head Refining Company, president; Fred G. Bannerot, Jr., Elk Refining Company, first vice president; Paul R. Beck, Pennsylvania Refining Company, second vice president; and Fayette B. Dow, general counsel, were elected to serve during the coming year.

Klein Appointed by Catalytic

George F. Klein, Jr., has been appointed manager of the process engineering department of Catalytic Construction Co. He formerly was chief engineer of Spencer Chemical Co. and also held important supervisory positions with the National Aniline division of Allied Chemical & Dye Corp. and Hercules Powder Co. He was also chief engineer of Refinery Engineering Co.

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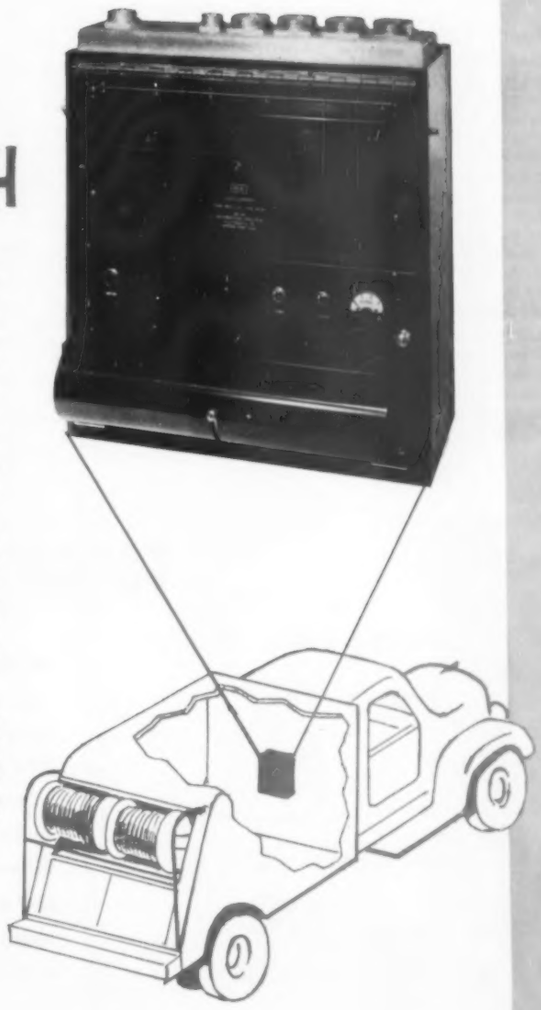

The new PRO-11-12 Recording Oscillograph answers the industry demand for a compact, light-weight instrument accepting 12-inch recording paper. The wide paper allows conventional presentation of dual records and permits wider galvanometer spacing to minimize "trace cross-over" in all multi-channel recording applications.

This latest addition to the field-proven SIE PRO Series is available with up to 60 SIE Precision Galvanometers and can accommodate recording paper sizes down to four inches in width.

The detachable Record Magazine is secured by a new spring-loaded latch, and can be removed or replaced with one hand. Timing motor operation is indicated on the front panel. Operating voltage is indicated by a meter on the panel. The Galvanometer and Timing assemblies are shock-mounted in the aluminum chassis which is enclosed in a welded aluminum case.

Specify the PRO-11-12 with your next system and take advantage of the increased dependability and recording flexibility of this outstanding SIE development . . . Add the PRO-11-12 to your present equipment to convert to dual recording.

SPECIFICATIONS:

Storage Magazine Capacity: 150′
Record Magazine Capacity: 20′
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New Producing Subsidiary

Mobil Producing Co., a wholly-owned subsidiary of Socony-Vacuum Oil Co., Inc., has been formed to take over the operations formerly handled by the Pegasus division of Socony-Vacuum. Mobil Producing Co. will conduct exploration and producing operations in the U. S. portion of the Williston Basin and in the northern Rocky Mountain area.

W. W. Clawson, formerly manager of the Pegasus division, was elected president of Mobil Producing Co. at the first meeting of the new company's board of directors. Mr. Clawson will also remain president of Socony-Vacuum Oil Co. of Canada Ltd. A. F. Barrett was elected vice president and manager of production of the new company, and John T. Rouse vice president and manager of exploration. Both men have been associated with the Pegasus division in Billings, Montana, since its establishment. Headquarters for Mobil Producing Co. will remain in Billings, where the company is now constructing a new office building.

John J. Neale Heads Lane-Wells

John J. Neale, assistant to the president of Lane-Wells Co. for the past year, was named president, succeeding Rodney S. Durkee, who becomes chairman. Walter T. Wells, former chairman, assumes the newly-created position of founder-chairman.

Mr. Neale started with Lane-Wells in Houston in 1936. He was Gulf Coast division manager for six years. Mr. Durkee joined the company as executive vice president in 1938 and was named president the following year, succeeding Mr. Wells, co-founder of the firm in 1932.

Ohio Injector Appointee

William G. Shepard has been appointed general sales manager for The Ohio Injector Company, supervising both domestic and foreign sales. Mr. Shepard has been with the company since 1945 and moves into his new post from the firm's Chicago office where he was division sales manager.

Reviews Foreign Geophysical Operations

Gerald H. Westby, president of Seismograph Service Corp. of Tulsa, is currently reviewing the international exploration picture in a tour of SSC operations overseas. He will visit crews now being operated in England and France by Seismograph Service Limited and by the Compagnie Francaise de Prospection Sismique, both foreign subsidiaries of SSC.

The tour will include an inspection of SSC operations in Egypt, operated by Seismograph Service Corp. (overseas). The project is one of the largest foreign developments ever undertaken.

In a side-trip, Westby will return to Algeria—the scene of his first work in geology. He was stationed there from 1920 to 1924 while working for S. Pearson and Sons. A crew from Compagnie Francaise de Prospection Sismique is now working there.

SSC also has four other subsidiary companies in foreign operation — Seismograph Service Corp. of Canada, Seismograph Service Corp. of Colombia, Seismograph Service Corp. of Mexico, and Seismograph Service Corp of Venezuela.

Max W. Ball

Max W. Ball, internationally known geologist and petroleum consultant, died at the Doctor's Hospital in Washington on August 28 following a heart attack. He was 68 years old and had been in full activity up to the time of his death.

Mr. Ball began his career in the petroleum field shortly after his graduation from the Colorado School of Mines in 1906 with the United States Geological Survey and later became chairman of its oil board. After leaving the government service, he located in Denver, Colorado, and engaged in work as a geological consultant in the United States, Canada and a number of foreign countries. He was the author of the book *This Fascinating Oil Business*, which was widely read and was considered the best popular presentation of the technical operations of the oil industry.

During World War II Mr. Ball was special assistant to the deputy administrator of the Petroleum Administration for War. In 1946 he joined the Department of Interior as head of its Oil and Gas Division and served in that position until December 1948, when he resigned to establish an office in Washington as a general petroleum consultant.

During the past several years Mr. Ball acted as petroleum advisor to the government of Turkey and in this capacity was instrumental in framing the petroleum law adopted by Turkey admitting foreign capital to participation in exploration for oil in that country.

Through his long professional career and his wide international travels, Mr. Ball established a broad circle of friends and acquaintances and became one of the best known figures in the international petroleum industry. He is survived by his wife, Mrs. Amelia Ball, a son, Douglas Ball, a daughter, Mrs. Jean Kaslof, who resides in Jerusalem, Israel, and several grandchildren.

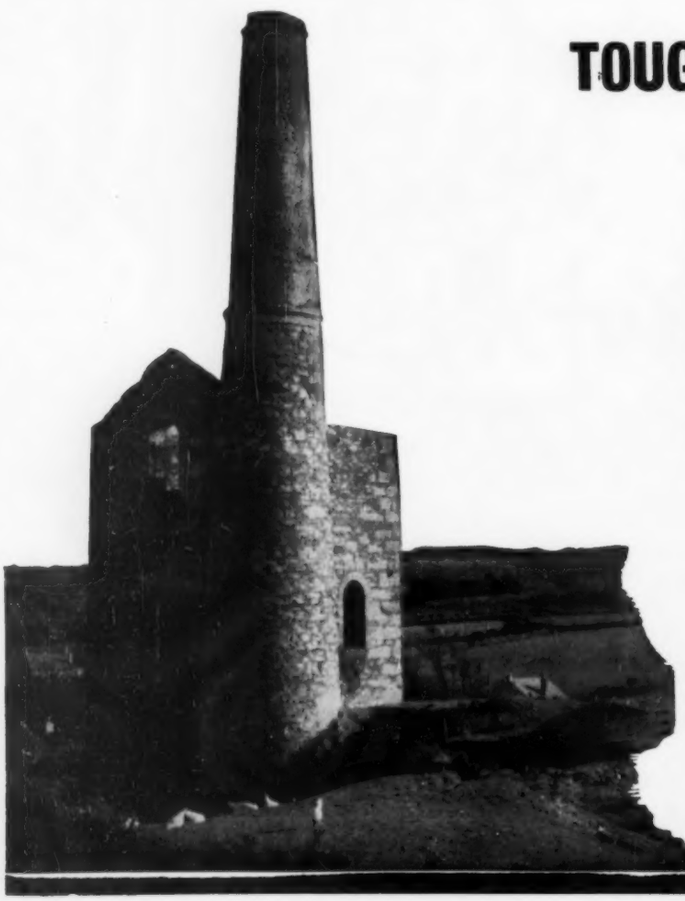
Maximilian Leister

Maximilian H. Leister, retired general manager of Sun Oil Company's motor products department, died September 19 at the age of 63. He joined the company in 1921 and directed the advertising and promotion campaign which marked the introduction of Blue Sunoco gasoline in 1927.

In 1932, when the company decided to use radio commercial advertising, Mr. Leister conducted the negotiations whereby Lowell Thomas was engaged as a news commentator. Later he conducted the company's campaign for Sunoco Dynafuel.

McCullough Opens Denver Office

McCullough Tool Company has opened a sales office in Denver, Colorado, in charge of J. M. Edwards, geologist and sales engineer. Mr. Edwards is a native of Aberdeen, Washington, and graduated from the University of Southern California with a degree in geology. He is a veteran of World War II and Korea.



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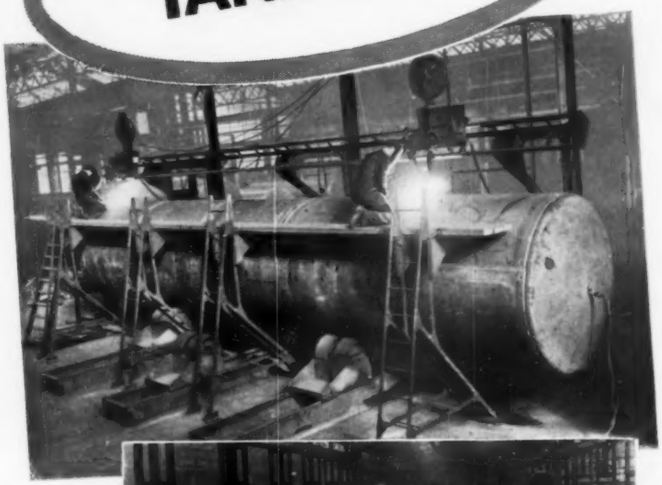

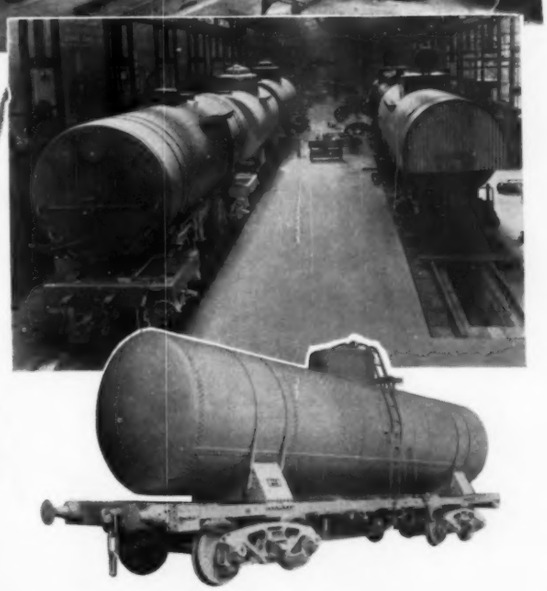

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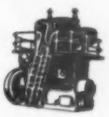

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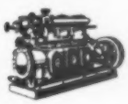

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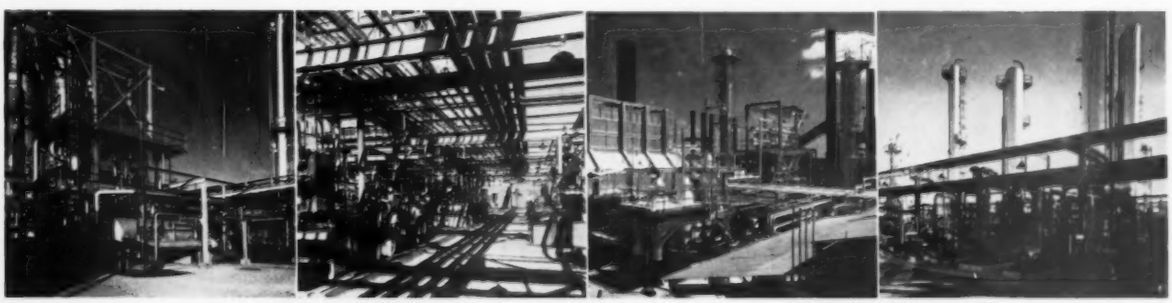

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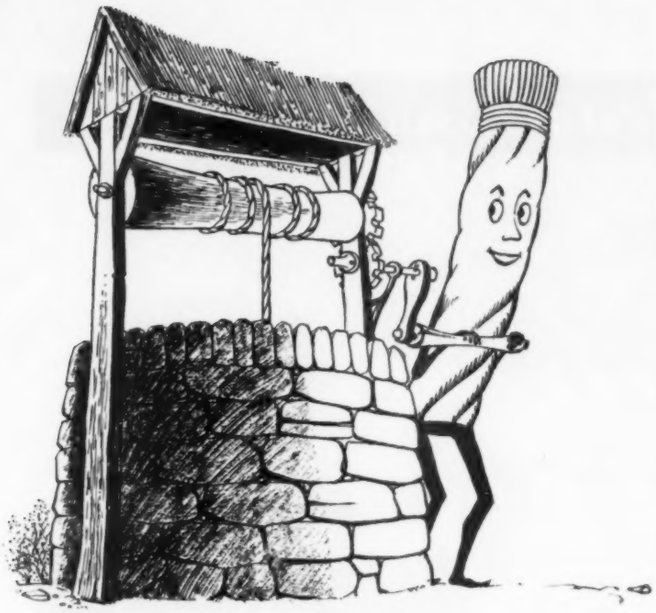

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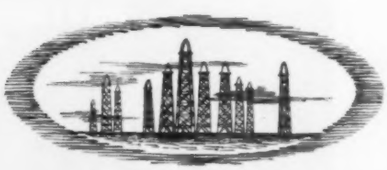

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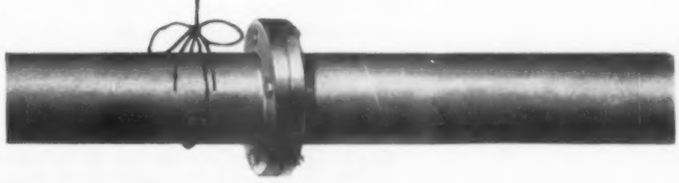

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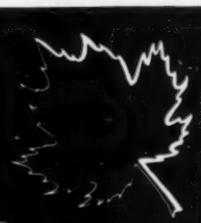
MARCH

DRILLING AND EXPLORATION

Exploration for oil and gas will be at peak level throughout the international field in 1955. The annual March survey will provide a complete picture of current activities and future plans with a special section on techniques and operations in the growing field of submarine exploration.



MAY

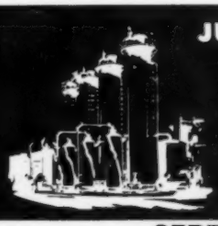
CANADIAN NUMBER

This will be the sixth annual survey of oil, gas and petrochemical progress in Canada. Each yearly number has grown in size, interest and distribution in what has come to be looked upon as the encyclopedia of the Canadian industry's development. The May number provides full coverage of the Canadian field with news stand sales and special orders in addition to the regular monthly distribution.

JUNE

WORLD CONGRESS NUMBER

The Fourth World Petroleum Congress will meet on June 6 in Rome, Italy. These Congresses meet every fourth year and the coming session will be the largest in their history, bringing together thousands of technical leaders, operating men and executives from all parts of the world. Editorial objectives of WORLD PETROLEUM are precisely geared to the international interests of the important group attending this meeting. The June issue, which will be distributed to delegates and visitors at Congress Headquarters, will have the complete story of the Congress, program of meetings, sketches and portraits of Congress personnel and scheduled speakers.



JULY 15

ANNUAL REFINERY REVIEW

The 24th Annual Review of refining activity and technical progress will chronicle developments throughout the world with authoritative articles on current problems, improvements in processing, outstanding new construction and a full directory of world refineries with their capacities and products. Copies of this issue go to every active refinery in the world.

SEPTEMBER

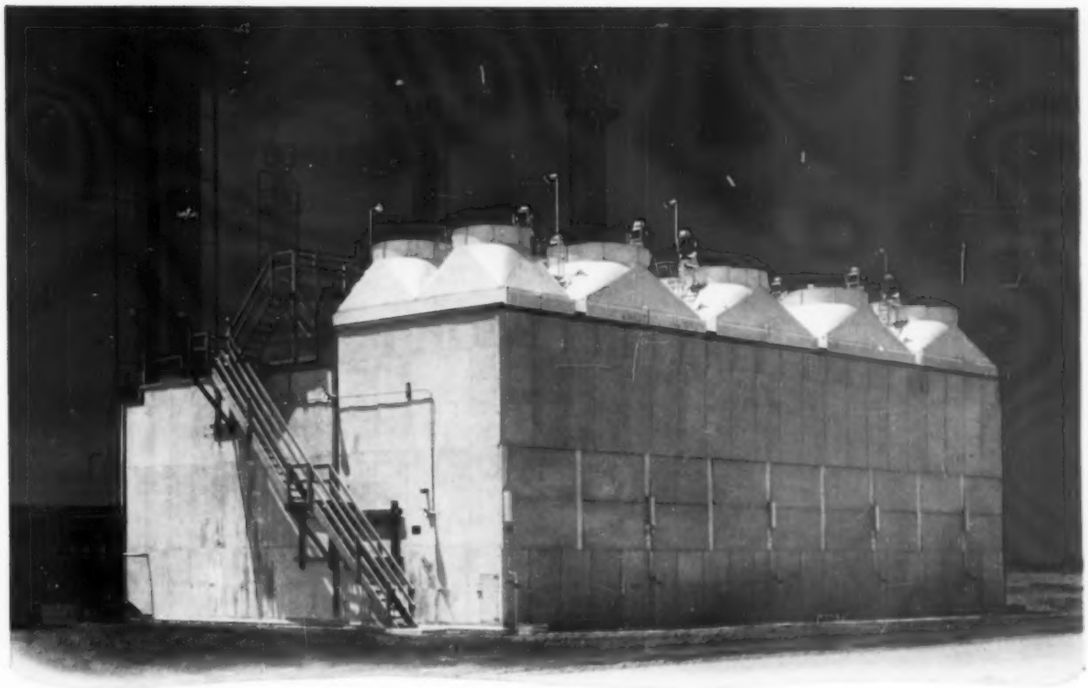
INTERNATIONAL SURVEY

Each September the editors of WORLD PETROLEUM present a summary of important developments in the international field with facts and statistics on operations in different countries and articles dealing with current problems affecting the industry's worldwide activities—an issue that always attracts exceptional attention.

NOVEMBER

A.P.I. NUMBER

Keyed to the yearly convention of the American Petroleum Institute and placed before those in attendance at the annual meeting, the November issue presents articles by leading members of the industry discussing problems of direct interest to management and operating men in all departments. It is a number that always receives close attention from men in all branches of the industry.



HUDSON *Combin-aire* UNITS

In four years of varied services have proven their advantages

COMBIN-AIRE units are in use for over 20 cooling services, operating on the humid Louisiana coast and the dry plains of West Texas and Oklahoma. Each unit has more than met its performance specifications.

The COMBIN-AIRE is a combination of a comparatively small Hudson water cooling tower with Hudson SOLO-AIRE hot fluid to air exchangers housed in one integral structure. In hot weather air to be used for cooling is reduced to near wet bulb temperature by contact with water near the bottom of the cooling tower. The cooled air is then used for cooling in the SOLO-AIRE units.

In cold weather the use of water is unnecessary. In the above photograph of the integrated structure the SOLO-AIRE units are in the upper foreground and the cooling tower portion is partially obscured in the background. In cold weather the shutters in the foreground may be opened to admit air directly to the SOLO-AIRE units.

Any one or more of the following proven advantages may dictate the use of COMBIN-AIRE for your next cooling problem.

1. **MINIMUM WATER REQUIRED.** No water used in cold weather. No loss from spray or carryover.
2. **NO WATER TREATMENT.** Hard water, sea water or water containing organic matter may be used.
3. **MINIMUM PIPING.** Absence of carryover or condensation allows installation adjacent to other equipment. Auxiliary shell and tube sub-coolers unnecessary.
4. **CLEAN AIR.** Air reaching Solo-aire units is free of dust, sand and insects.

The COMBIN-AIRE unit is protected by United States patents

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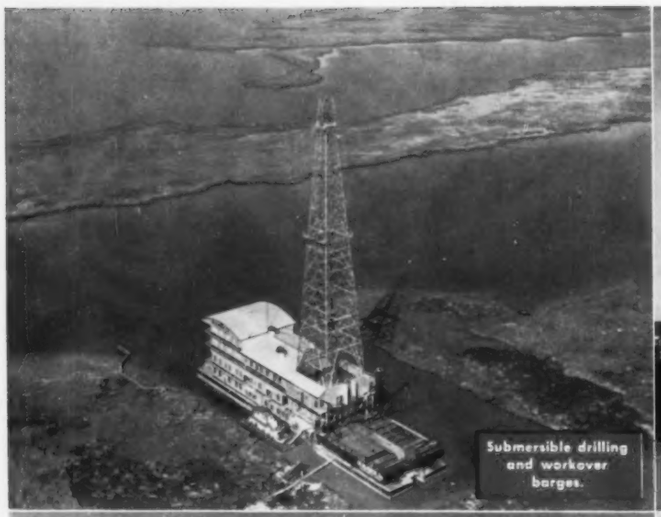
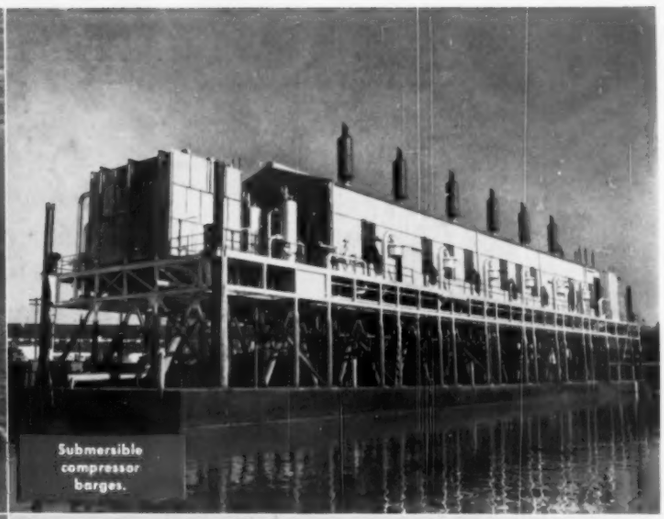


Submersible drilling and workover barges.



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Off-shore drilling barges or tenders.

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